

TROPICAL DISEASES BUREAU.

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# SANITATION SUPPLEMENTS

OF THE

## TROPICAL DISEASES BULLETIN.

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### APPLIED HYGIENE IN THE TROPICS.

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### DISEASE PREVENTION.

LAMOUREUX (A.). **L'hygiène à la Martinique en 1921.**—*Bull. Soc. Path. Exot.* 1922, Mar. 8. Vol. 15. No. 3. pp. 179-188.

The writer gives a description of the conditions of sanitation in Martinique, which resembles many other places in the tropics where long neglect has been the order of the day.

He describes a suburb called "Terre Sainville," which is grossly overcrowded with small houses, not arranged according to any plan, and with a large number of domestic animals accommodated in the neighbourhood. The authority for sanitary administration in the town is vested in the Mayor. Yellow fever is occasionally found in the neighbourhood, and Stegomyia appears to be plentiful.

The author considers that the most pressing need is a proper sanitary organization and strict enforcement of the law. A considerable amount requires to be done under the head of sanitary engineering, such as construction of sewers, surface drainage of low-lying places near dwellings, and the construction of modern slaughter-houses.

MINK (O. J.). **The Medical Department in the Virgin Islands.**—*Amer. Jl. Trop. Med.* 1922. Jan. Vol. 2. No. 1. pp. 59-62.

The writer gives a description of the sanitary arrangements formerly in existence under the Danish Government. A good deal appears

to have been left to the individual. No very high standard of sanitary excellence was required.

Since the islands were taken over by the American Government a good deal has been done, the following being the main improvements effected :—

1. Marked reduction in infant and general mortality-rate.
2. Administration of typhoid prophylaxis, causing a decrease of this disease.
3. Disappearance of pellagra.
4. Improvement of general sanitation, particularly as regards mosquitoes.
5. Accurate recording of vital statistics.
6. Treatment of the deformities from filariasis.
7. Improved conditions in the production of food.

HAYDEN (Reynolds). **Review of the Reorganization of the Sanitary and Public Health Work in the Dominican Republic under the United States Military Government of Santo Domingo.**—*Amer. Jl. Trop. Med.* 1922. Jan. Vol. 2. No. 1. pp. 41-57; and *U.S. Nav. Med. Bull.* 1922. Apr. Vol. 16. No. 4. pp. 657-671.

The writer gives a description of the sanitary organization suggested by himself for the amelioration of conditions in the Dominican Republic. The arrangements followed the usual lines. First of all a legal enactment was promulgated, divided into four chapters : (1) deals with the establishment of a department of organization, administration, and formulation of a sanitary code ; (2) regulations concerning the medical profession and trades dealing with drugs and poisons ; (3) establishment of a national quarantine service ; (4) provides for the enforcement of sanitary law and sanitary codes.

A council of five was established, whose duties were divided thus (1) a division of vital statistics, transmissible diseases, and quarantine, (2) division of sanitary engineering, (3) a national laboratory, and (4) division of registration and accounts. The various divisions worked under very considerable difficulties, owing to the want of reliable work figures prior to this date (1918).

The note also gives an interesting description of the state of affairs prior to the organization of the sanitary department. Preventable diseases in the order of relative importance are (1) venereal disease, (2) malaria, (3) ankylostomiasis, (4) tuberculosis, and (5) yaws. Infantile mortality in 1920 was as low as 66 per 1,000.

Antimalarial measures are chiefly of a domestic nature. There are no swamps. The difficulties in the way of remedying malaria do not appear to be very serious.

The estimated infestation with hookworm was 52 per cent. of the population as a whole. The north central part shows as high a figure as 70 per cent., the arid western portion only 12 per cent. The Dominicans do not appear to show pronounced symptoms as a result of the presence of the worm.

New methods of treatment of yaws are giving most excellent results.

The difficulties met with by the commission in remedying affairs are common all over the world, namely, ignorance of the people, lack of energy on the part of local authorities, and lack of money.

MCLEAN (N. T.). **Public Health Problems of the Southern Countries.**—*Amer. Jl. Trop. Med.* 1922. Jan. Vol. 2. No. 1. pp. 25-39.

This paper covers almost the same ground as the preceding one. The writer was working in another part of the island of Haiti, and started very much the same sanitary organization. He, however, somewhat disapproves of regulating the local medical practitioner. The paper gives an interesting account of social conditions in the island.

BALFOUR (Andrew). **A Medical and Sanitary Survey of Mauritius : Past, Present and Future.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1921. Nov. 17 & Dec. 15. Vol. 15. Nos. 5 & 6. pp. 157-179. With 50 illustrations.

We have already reviewed in Supplement No. 1 (1922), pp. 44-47, seven reports by Dr. Balfour on various problems in Mauritius. The above paper is a résumé of a lecture delivered by him in London, and covers exactly the same ground. Consequently it is not necessary for us to deal with the subject. At the lecture, however, a very large number of beautiful slides were shown. Some of the more important, from a scientific point of view, are reproduced.

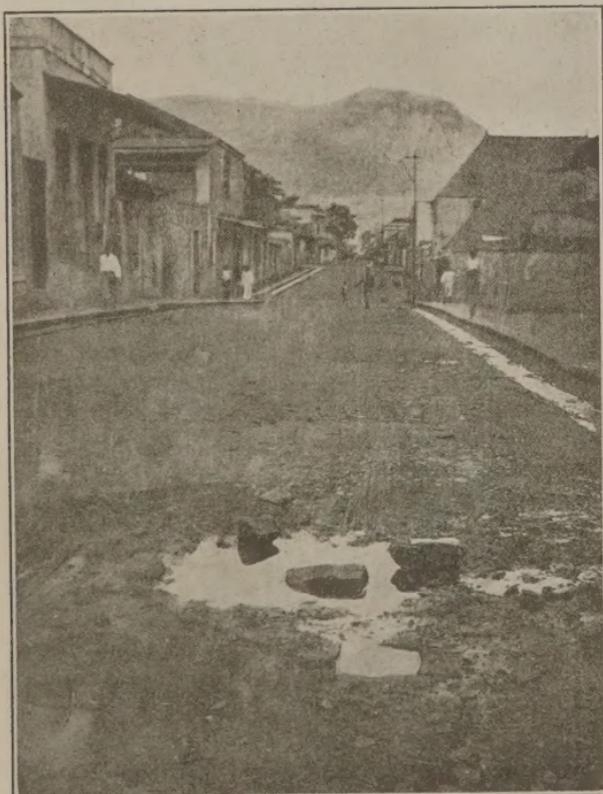


FIG. 54. A leaking "Regard" in one of the Port Louis streets—breeding-place for *Anopheles costalis*.

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FIG. 55. Portion of Black River at the time of Ross and Fowler's visit, 1908.

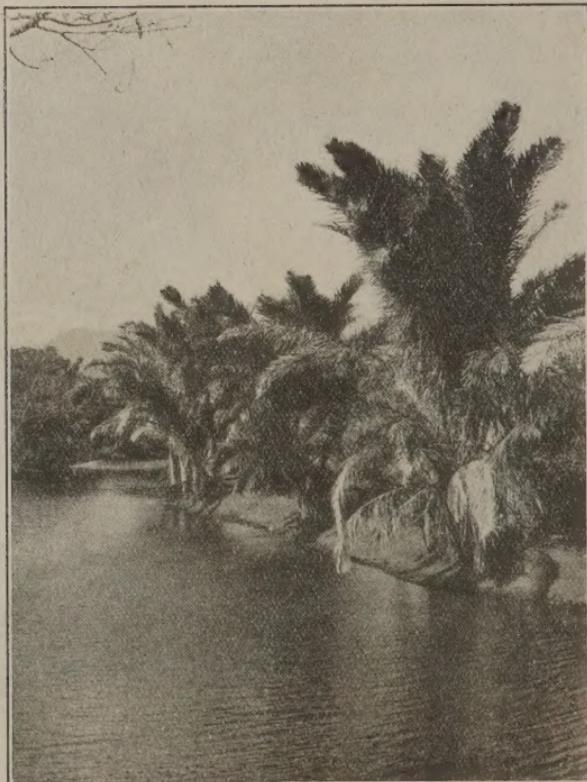


FIG. 56. Same portion of Black River at the present time.

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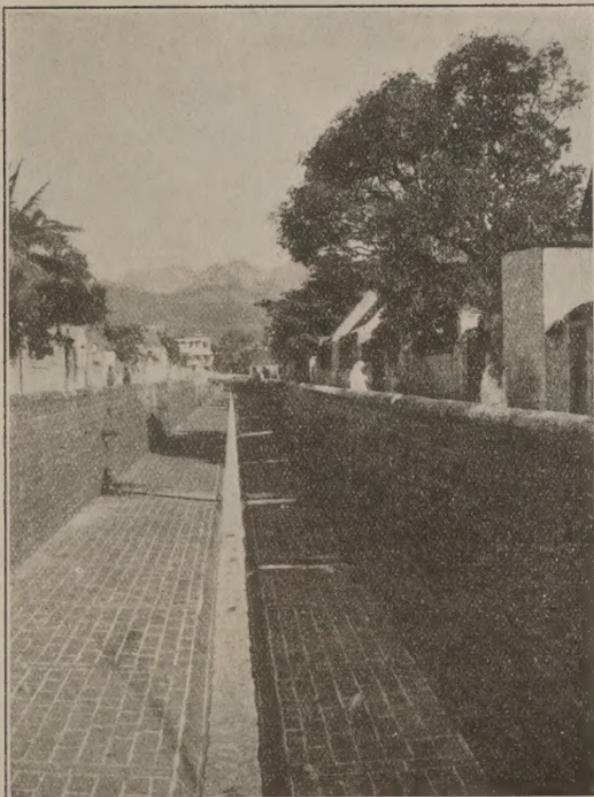


FIG. 57. Canalization of a water-course traversing Port Louis. Note the excellent old Pavé, the side drains and the hill range in the background.

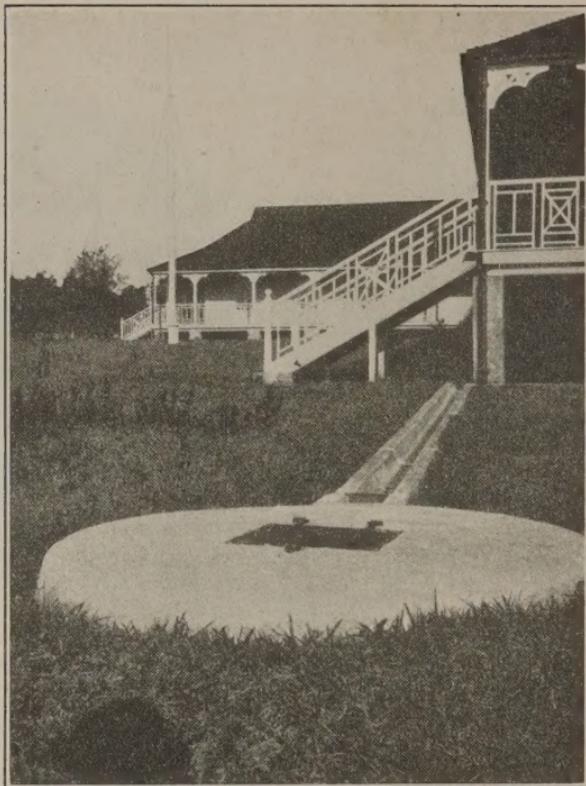


FIG. 58. Disposal of waste water. Arrangements at British Barracks at Vacaos. Large covered soak-pit in foreground. The soil here is very porous.



FIG. 59. Portion of the model village being erected by Sir Hesketh BELL at Cassis, on the outskirts of Port Louis.

[Reproduced by permission from the *Transactions of the Royal Society of Tropical Medicine and Hygiene*.]

SAWYER (W. A.). **Some Directions in which Advance in Preventive Medicine could be made in Queensland.**—*Med. Jl. Australia.* 1922. Feb. 11. 9th year. Vol. 1. No. 6. pp. 141-144.

The author deals with three main points in which improvements should be made: (1) hookworm; (2) milk supply; (3) general sanitation.

By far the most interesting part of the article is that dealing with hookworm.

This disease is fairly prevalent in parts of Queensland, but apparently the distribution is very uneven, as would be expected. Portions of Papua and "German" New Guinea, being occupied by a coloured population, are much worse affected than the portions of Queensland inhabited by Europeans.

The writer considers that the whole of this country should be divided into districts, and classifies them into seven classes, according to the amount of infection present. He has an extremely ingenious way of obtaining these figures. At regular intervals, usually annually, he examines a large number of school children; the percentage of children found to be infected, multiplied by the factor given in the table, gives the percentage of infection in the general population in which the children reside. This figure he calls the hookworm index.

*Table for Use in Estimating the Hookworm Index of Australian White Communities.*

Age or Age Group of Persons Examined.	Multiply Infection- rate by Factor below to obtain Index.
6 .. .. ..	0.88
7 .. .. ..	0.79
8 .. .. ..	0.72
9 .. .. ..	0.64
10 .. .. ..	0.59
11 .. .. ..	0.53
12 .. .. ..	0.49
13 .. .. ..	0.46
14 .. .. ..	0.43
15 .. .. ..	0.42
16 .. .. ..	0.44
17 .. .. ..	0.50
18 .. .. ..	0.58
8 to 12 .. .. ..	0.57
6 to 18 .. .. ..	0.57
All ages .. .. ..	1.00

"To illustrate the use of the table, consider a group of white school children of the approximate age of eight years, in which 20 per cent. are found to be infected with hookworms. The hookworm index, or estimated infection-rate for all ages in the same community, would be 0.72 times 20, or 14.4. On the other hand, if the group ranged fairly evenly between the ages of eight and twelve years, and the infection-rate was 20 per cent., the estimated infection-rate for the whole community would be 0.57 times 20, or 11.4. The table would apply only to white communities where conditions are comparable with those in Queensland."

## Methods Employed.

"On the basis of the hookworm index, all territory in Australia would be classified under the plan as follows:—

- " Class 1.—Index, 0 to 0·9. No endemic hookworm disease.
- " Class 2.—Index, 1 to 4·9. Very light infection.
- " Class 3.—Index, 5 to 9·9. Light infection.
- " Class 4.—Index, 10 to 19·9. Moderate infection.
- " Class 5.—Index, 20 to 49·9. Heavy infection.
- " Class 6.—Index, 50 to 100. Very heavy infection.
- " Class 7.—Groups requiring special measures. Territories of Papua and late German New Guinea and settlements of Australian aborigines having a high infection rate."

Preventive measures follow the usual lines, namely, treatment of the patient, inspection and removal of insanitary latrines, and careful instruction of school children in the method of spread of the disease and the avoidance of reinfection.

The establishment necessary for any district is measured by the hookworm index, or, in other words, the amount of infection in the population of that district.

Class.	Index.	Survey.	Control Measures.	Special Education.
1	0 to 0·9	Original survey only, unless changed conditions require re-survey.	None . . . .	None.
2	1·0 , , 4·9	Annual index taking. At beginning, survey with intensive control only where gradual methods would be inadequate.	Control measures with index taking as described above. Intensive control in special instances.	Educational measures with index taking as described above, and with intensive control measures. Educational work in the schools as described above.
3	5·0 , , 9·9	Survey with intensive control at beginning and every three years. Index taken in other years.	Intensive control at beginning and every three years. Control measures with index taking in other years.	As for Class 2.
4	10·0 , , 19·9	As for Class 2, except intensive control repeated every two years.	As for Class 2, except intensive control repeated every two years.	As for Class 2.
5	20·0 , , 49·9	Survey with intensive control or "follow-up" work each year.	Intensive control or "follow-up" work each year.	Education measures with intensive control. Educational work in the schools as described.
6	50·0 , , 100	As for Class 5 . .	As for Class 5 . .	As for Class 5.
7	—	Initial survey by Hookworm Campaign.	Co-operate with officials, employees, mission superintendents and others as described.	Special educational measures during survey and afterward through co-operation as explained.

The author's recommendations are given in a tabular form.

The method of arriving at the index for the district is interesting; the only criticism we have to make is that the table of factors for different ages is constructed from the results of the examination of under 10,000 whites in Queensland. It would appear to us that this is a very small number on which to base the formulation of a numerical factor.

The remarks on the milk supply and general sanitation do not call for special notice.

CLEMOW (F. G.). **Plague, Cholera, and Typhus in Turkey and Adjoining Countries. A Twelve Months' Record.**—*Lancet.* 1922. Feb. 4, 11, & 18. pp. 242-243; 291-292; 341-342.

These three articles give a careful account of plague, cholera and typhus in the Turkish Empire and Southern Russia during the year 1920 and portions of 1921.

They are of very great importance to health officers of ports and all concerned with the prevention of spread of communicable diseases from one country to another.

It is hardly necessary for us to go into details of the various outbreaks throughout this very wide area; as usual, cholera is largely associated with famine.

An interesting light is thrown on the mentality of the present Government of Russia by the study of the measures to be put in force to meet the epidemic; these are given below. They are not likely to commend themselves to many Governments.

“ 1. Cessation of communication with the Don region, and particularly with Rostof, for the purpose of obtaining food supplies for more northerly provinces.

“ 2. Cleansing of sources of water supply.

“ 3. A ‘Water and Cleansing Week,’ with compulsory labour (‘ Semaine de corvée d'eau et de nettoyage ’), at Moscow; this appears to have been really of two weeks’ duration—from June 5th to 18th.

“ 4. Repairs of the water supply system at Moscow—in reference to which, however, the *Red Gazette* is quoted as remarking that, to judge by the rate the work was progressing, 80 years would be required to complete the repairs.

“ 5. Repair of baths, provision of public supplies of boiled water; removal of rubbish; the summoning of all persons to take part, *en masse*, in the cleaning up of towns and villages.

“ 6. Appointment of an ‘Extraordinary Sanitary Triumvirate,’ composed of a doctor, a communist, and a ‘Tchekist,’ or member of the Extraordinary Commission for Combating the Counter-Revolution, with powers of dictatorship.

“ 7. Anticholera inoculations, accepted, it is said, only by the intellectual classes, the ‘people’ being hostile to them. Inoculation, however, was said to be compulsory for medical staffs, railway personnel, escorts of food transports, persons engaged in removing cholera patients, removal of rubbish, and so forth.

“ 8. Appointment, on July 2nd, of a special Cholera Commission at Moscow.

“ 9. Stoppage of railway communication with infected districts from July 21st.

“ 10. The establishment of quarantines from July 19th.

“ 11. The placarding of public notices on walls and kiosks. One such notice is quoted; it is as follows:—

“ (a) It is forbidden to all inhabitants of cholera-infected districts, as also to those of a zone of 100 versts to the west thereof, to pass from one place to another without permission of the authorities. Persons infringing this rule will be shot on the spot.’ [An identical measure, it may be recalled, was imposed by Peter the Great, at the time of plague epidemics in 1709 and 1718; it proved quite useless, however, for arresting the march of the disease.]

" (b) Bodies of persons dead from cholera are to be handed over to special detachments, for immediate cremation.

" (c) Houses where cholera sick are found will be immediately evacuated, disinfected, or, if disinfection is impossible, burnt."

MOUCHET (R.) & PEARSON (A). **La valeur des vaccins microbiens dans l'hygiène des travailleurs noirs.**—*Ann. Soc. Belge de Méd. Trop.* Brussels. 1921. May. Vol. 1. No. 2. pp. 139-147. With 2 charts.

The paper describes the use of vaccines amongst the African Labour Force in the mines near Elizabethville, in Belgian Congo. Amongst the Europeans enteric was fairly common till 1914 when they were inoculated.—

In 1911 there were 10 cases.	In 1917 there were 9 cases.
„ 1912 „ „ 10 „	„ 1918 „ „ 4 „
„ 1913 „ „ 12 „	„ 1919 „ „ 8 „
„ 1914 „ was 1 case.	„ 1920 „ „ 5 „
„ 1915 „ „ 1 „	
„ 1916 „ were 7 cases.	(8 months).

Out of 36 cases, 5 were in inoculated persons. These were very mild, and occurred 21, 22, 14, 17, and 12 months after inoculation.

About 1914 the African Labour Force began to be affected with enteric fever caused by polluted water and flies. It was most severe during the rainy season when flies were very prevalent, and mild during the cold dry months. In 1916 there was a bad outbreak, with 7 cases in August, 39 in September, and 101 in October. The whole population was inoculated, and the number of cases diminished rapidly.

Subsequent to this the water supply was improved and strict anti-fly measures carried out, with marked improvement in the incidence of the disease.

1917. Labour Force, 4,513, cases 103.
1918. „ „ 6,367, „ 41.
1919. „ „ 8,221, „ 2.
1920. „ „ 12,500, „ 2 (8 months).

Many new recruits were either incubating or suffering from the disease. Subsequently a quarantine camp was started, where they were kept for a period of 15 days, given a suitable diet, and vaccinated against small-pox, typhoid, and pneumonia. As a result of these measures the disease amongst the blacks became very much less prevalent than amongst the white population.

The mortality from pneumonia was also greatly reduced by vaccination done regularly every year.

NEDERGAARD (N.). **Malaria in Eastern Cuba.**—*Amer. Jl. Trop. Med.* 1921. Nov. Vol. 1. No. 6. pp. 381-388. With 3 charts in text.

The writer gives a very interesting description of malaria amongst the labour force of a large plantation.

Apparently there are three types of labour on the estate—Haytian, Jamaican, and Cuban. The latter suffer very much less from malaria than the Haytians and Jamaicans, because during the malaria season they are unemployed and live in towns where they are better housed.

The Jamaican labour was employed on very heavy work during the rains, such as building roads, etc.; they suffer considerably from exposure to mosquito bites, and the debilitating influences of poor food and insufficient protection against wind and rain.

The author also points out that many intractable cases of malaria were found to harbour ankylostoma. When this condition was treated the patient made a rapid recovery.

MONTH.	HAYTIAN.			JAMAICAN.			CUBAN.		
	Number ex- amined.	Tertian.	Estivo- autumn- nal.	Number ex- amined.	Tertian.	Estivo- autumn- nal.	Number ex- amined.	Tertian.	Estivo- autumn- nal.
September ..	126	17	28	43	6	11	17	0	0
October ..	59	2	12	130	7	48	14	0	3
November ..	49	5	16	264	14	160	24	1	2
December ..	75	4	34	259	16	166	28	0	8
January, 1921	155	4	27	157	14	90	26	3	10
February ..	345	2	61	96	7	48	30	0	6
March ..	293	4	81	76	7	29	31	1	2
April ..	230	7	123	76	9	23	22	1	7
May ..	366	15	233	84	7	46	24	1	8
June ..	442	27	243	105	5	50	41	0	10
July ..	411	23	165	119	12	50	48	0	11
August ..	182	17	97	56	4	20	15	0	5
Total ..	2,733	127	1,120	1,465	108	741	320	7	72
Per cent. ..	96.5	4.7	41.0	93.7	7.4	50.6	96.4	2.2	22.5

The quartan parasite was found eighteen times in Haytians and five times in Jamaicans.

SUTTON (Harvey). *Anti-malarial Work in Palestine*.—*Australasian Med. Congress. Transactions of the Eleventh Session held in Brisbane, Queensland, 21st-28th August, 1920.* pp. 306-310.

The author was O.C. of the Sanitary Section in the Anzac Division in Palestine, and saw a great deal of the prevention of malaria in the Jordan Valley and other parts of that country. *Anopheles bifurcatus* was a common insect vector in this campaign, and frequently bred in cisterns even in the winter. The measures used for remedying the conditions of affairs on the banks of the Jordan are those known in all parts of the tropics.

SERGENT (Edmond), in collaboration with SERGENT (Étienne). *L'assainissement de la Corse*.—*Bull. Acad. Méd.* 1922. Feb. 7. Vol. 87. No. 6. pp. 163-168.

The author gives the results of the antimalarial survey of Corsica in the year 1921.

In Corsica one child in four (227 in 952) has enlargement of the spleen, and one child in seven (140 in 942) has parasites in the blood: the spleen index is thus 23 per cent., and the parasite rate 14.7 per cent.

If one confines one's attention to the Eastern plain, which has a very bad reputation for malaria, we find that two children in five (189 out of 473) have enlarged spleens, = 39.9 per cent., and one child in four (124 in 473) has parasites in the blood, = 26.2 per cent. Children of six years show the greatest percentage of infection, and both sexes are equally affected.

In this neighbourhood two-thirds of the cases have *Plasmodium falciparum* in the blood, and about one-fourth *vivax*; in 3 per cent. the infection is mixed. Of 942 children examined 43, or 4.9 per cent., had the sexual form of parasites in their blood, a measure of the risk of infecting mosquitoes.

*Anopheles maculipennis* is very prevalent in the island; 251 specimens were dissected, and three (1.2 per cent.) contained sporozoites in the salivary gland.

Prophylactic measures follow the usual lines, such as removal of breeding-places and antilarval measures, and quinine for treatment and prophylaxis.

The large salt marshes on the borders of the sea have always caused considerable trouble. An attempt is being made to drain by a canal ; it is, however, extremely difficult on account of the lack of fall.

**GOLD COAST. Report on the Medical Department for the Year 1920.**

With Appendix : Medical Research Branch. Accra Laboratory Report for the Year 1920. [MACFIE (J. W. S.), Director of Medical Research.] 64 pp. 1921. Accra : Government Press. [Price 3s.]

*Anopheline Mosquitoes and Malarial Infections at Accra.*

" Of the 432 specimens collected, 428 were *Anopheles costalis*, three *A. pharoensis*, and one *A. funestus*. Of the 231 specimens dissected only one was found to have sporozoites in its salivary glands ; this was a specimen of *A. costalis* taken in June 1919 in Bungalow A.10.

" This result and the well-known prevalence of malaria in Accra are difficult to reconcile, and it may be of use to record here briefly the data so far as they are at present worked out.

" Two cardinal factors are considered to be necessary for the spread of malaria, (A) the parasite in the vertebrate host, and (B) the insect capable of transmitting the disease. So far as is known the vertebrate host is always a human being, and the insect transmitter an Anopheline mosquito.

" As regards (A), the parasite in the vertebrate host :—

" I. Malaria is very common in Accra. Some examinations made in 1919 showed that of 32 adults, inmates of the Asylum, 37.5 per cent. were infected, and that among apparently healthy school-boys 27.9 per cent. of those of 15 to 18 years, 56.3 per cent. of those of 9 to 14 years, and 75.8 per cent. of those of 5 to 8 years were infected. These figures relate to only a single blood examination and are therefore minimal.

" II. Malignant tertian malaria is the common type. Of the infections referred to above 85 per cent. were malignant tertian.

" III. The stage of the malignant tertian parasite infective to mosquitos, the crescents, is singularly uncommon. In the infections referred to above crescents were found in only 5 per cent. of the malignant tertian cases.

" As regards (B), the insect capable of transmitting the disease :—

" IV. Mosquitos do not appear normally to be very common in Accra. In eight consecutive months one year I was only able to collect 280 in my bungalow and the boys' house adjoining.

" V. Of the mosquitos found Anophelines form only a small proportion. Of the 607 mosquitos collected in houses and offices in Accra, 1919-1920 (See Table VI) only 14 per cent. were Anophelines. Of the samples of larvae received from the Medical Officer of Health, Accra, from 1912 to 1915 only 1.6 per cent. contained larvae of Anophelines.

" VI. Of the Anophelines that are found nearly all are *Anopheles costalis*. From May 1919 to April 1920 we collected 432 Anophelines ; of these 99 per cent. were *A. costalis*.

" VII. Of the *A. costalis* very few appear to be infective with malaria. From May 1919 to April 1920 we dissected 227 females ; only one was infective, that is, 0.4 per cent.

" From the data given in III to VII it might have been anticipated that malaria would be rare in Accra ; that this is not the case is shown in I. How these apparently inconsistent facts may be reconciled is not certainly known, although plausible explanations are not difficult to devise. It would appear, however, that the position in Accra is an unfavourable one for the spread of the malaria parasites, and that a very little more might perhaps turn the scale definitely against it."

*Filthy Lucre.*

" Having received from the Bank a pile of damp and dirty shilling notes that well deserved the name of 'filthy lucre,' I therefore examined them in the following manner. Ten of the notes, taken at random, were placed in a sterile dish and soaked for half an hour in 200 cc. of sterile normal saline solution. They were then brushed with a sterile brush and removed from the dish. The fluid left behind was (1) examined with a microscope, (2) tested for '*B. coli*' in the same manner as a water sample, (3) plated on agar, sown in broth, &c., for the detection of bacteria, yeasts, moulds, and similar organisms, and (4) centrifuged and the deposit examined.

" The results of this examination were as follows. The presence of '*B. coli*' was not demonstrated, and no other evidence of faecal pollution, such as eggs of intestinal worms or cysts of intestinal protozoa, was obtained. As would naturally be expected the fluid was found to contain vast numbers of bacteria, yeast cells, moulds, etc ; those that over-grew all others in cultures being a long Gram-positive bacillus and an organism of the *B. subtilis* type. The deposit thrown down on centrifugalisation contained sand and grit, a good deal of food material, pollen grains, and not a few sarcoptid mites and their eggs. The mites were alive and active."

BARBER (M. A.) & HAYNE (T. B.). **Arsenic as a Larvicide for Anopheline Larvae.**—*Public Health Rep.* 1921. Dec. 9. Vol. 36. No. 49. pp. 3027-3034.

The authors quote ROUBAUD, who discovered that a poisonous dust (parafform) sprinkled in water is devoured by Anopheles larvae, and that the recipient dies in consequence. Many experiments were carried out, using trioxymethylene, Paris green, white arsenic, lead arsenate, etc., both in laboratory and in the field. The results appear to be that Paris green is superior to the arsenate compounds. Two experiments are given :—

" Ten anopheline larvae, the size of which varied from one-quarter grown to full-grown, were fed on trioxymethylene, and nine similar larvae on Paris green, the dosage varying from 'minimum'—that is, the ingestion, or apparent ingestion, of one or two particles—to a dose represented by three seconds' feeding. Of the larvae fed on trioxymethylene none was dead sixteen hours after feeding, while four of the nine fed on Paris green were dead within three hours, and a fifth in less than five hours. Since one could not always be sure that a larva taking the 'minimum' dose had really swallowed the poison, the experiment was repeated, allowing doses of three to five seconds. Of twelve fed on Paris green, eleven died within periods varying from 85 to 103 minutes, while of twelve fed on a similar dose of trioxymethylene, six survived at least four and a half hours. The six of this lot which died, however, showed a shorter average time of survival than that of the eleven which succumbed to Paris green ; 62.5 minutes was the average survival time of the trioxymethylene, and 90.7 of the Paris green.

"In another series trioxymethylene, lead arsenate, and Paris green were compared, the dosage of the first two poisons varying from four to fifteen seconds, and that of the Paris green from two to ten seconds. All of the larvae fed on the trioxymethylene, four in number, died in less than one hour ; of the Paris green series nine out of ten died within less than two hours and the tenth after about seven hours ; of the lead-arsenate series practically all survived until the next day or later."

Paris green can be purchased at a dollar a pound retail, and twenty-two cents if bought in quantity.

We confess we cannot get up much enthusiasm for this new method of procedure. It does not appear to be superior to an emulsion of oil (especially if up to 2 per cent. of castor oil be added), and it would be highly dangerous in many tropical countries inhabited by primitive races.

**CASTILLO NÁJERA (Francisco).** **The Campaign against Yellow Fever in Mexico.**—*Amer. Jl. Public Health.* 1922. Mar. Vol. 12. No. 3. pp. 181-187.

The writer gives an account of the decline of yellow fever in Mexico. The article is very imperfect in many respects. Apparently in 1903 there was a total of 3,848 cases, with 1,583 deaths, in Mexico as a whole. About this time measures were taken to reduce this death-rate. According to the figures (Table 2) the disease had practically disappeared by 1908. No cases were recorded from 1909 to 1912. There is then a blank in the records from 1912 to 1920. In 1920-21, evidently, there was an outbreak, for a determined effort had to be made to stamp out the disease, assistance being sought from the American Government and the Rockefeller Foundation. About half a million dollars was expended on these measures, which followed the usual lines, with the exception that there was anti-yellow-fever vaccination within the infected area.

**COELLO (Carlos V.).** **The Present Sanitary Conditions at Guayaquil, with Special Reference to Yellow Fever.**—*Amer. Jl. Public Health.* 1922. Mar. Vol. 12. No. 3. pp. 188-192.

The writer of this article gives a fairly detailed account of the anti-yellow-fever campaign carried out by several authorities at Guayaquil, in Ecuador.

On pages 72-73 of the Sanitation Supplement, March 30, 1921, we gave the results of this work as recorded in the Rockefeller Foundation Review for the year 1919. There is no need to repeat the figures. It is, however, interesting to point out that this report, written two years later, shows that there has been no recrudescence of the disease. Confidence in the Port has been restored in neighbouring countries ; this has allowed of the modification of the former very strict quarantine regulations against Guayaquil, and the number of visitors and immigrants to the town has gone up steadily.

Other sanitary matters, such as drainage and water supply, are now receiving attention.

**CONNOR (M. E.).** **Notes on the Use of Freshwater Fish as Consumers of Mosquito Larvae in Containers used in the House, based upon Experience in Guayaquil, Ecuador, and Merida, Yucatan, Mexico.**—*Amer. Jl. Public Health.* 1922. Mar. Vol. 12. No. 3. pp. 193-194.

The writer gives a very condensed account of his experiences with larvae-eating fish in many campaigns against yellow fever. Some of

these results have been previously published in the Rockefeller Foundation Review. He was largely responsible for the great reduction in the incidence of yellow fever in Guayaquil described in the previous article. He points out that a continuous water supply for 24 hours a day is, for many places, a council of perfection, because it is much too costly ; consequently, in places with an intermittent supply, storing of water in houses is resorted to ; these small stores breed *Aedes calopus* in large numbers. A temporary expedient to reduce breeding is the use of fish ; to make these effective the following points must be attended to :—

“ That the fish be in a sound condition when placed in the container.  
“ That the water in the container receive sufficient air to support fish life.

“ That the container be protected from the sun.

“ That there be placed at the bottom of the container, against the side, a cave-like arrangement beneath or behind which the fish can rest or can hide when frightened. A condensed milk can, a curved piece of earthenware, or an elevated stone device made by resting a flat stone on two other stones, will suffice.”

Larvae-eating fish are divided into two varieties—top feeders and bottom feeders. Top feeders are best for open-air fountains and larger quantities of water of that nature. Bottom feeders are best for tubs, barrels, etc., situated in the house.

The author made the following distribution in Merida, the results being very satisfactory :—

“ Aljibe or cistern, one fish only, preferably male ; bottom feeder.  
“ Well, if filled from below, two or more ; top feeders.  
“ Well, receiving rain from roof or patio, one or more ; bottom feeders.  
“ Barrel, one fish only ; bottom feeder.  
“ Pila, fountain, etc., two or more ; top feeders.”

Apparently no fish will live in metal tanks ; for these tight-fitting lids must be provided. Fish are best caught with a pin-hook baited with meat ; the damage done to the mouth by a pin seldom causes death.

ALLEN (A. H.). **Mosquito Eradication.** — *U.S. Nav. Med. Bull.* 1922. Jan. Vol. 16. No. 1. pp. 1-8. With 1 map & 8 illustrations.

The Naval Dockyard at Philadelphia has always had an unenviable reputation for mosquitoes. In 1793, 4,000 people died of yellow fever in the neighbourhood, and, although there has been very little or no recurrence of the disease, the mosquitoes still abound.

In 1915 a board was appointed to make recommendations for the permanent eradication of the nuisance. The committee appointed consisted of four medical officers, one civil engineer, one construction officer, and a yard master ; three medical officers acting as inspectors.

The inspectors all report on a uniform plan.

Apparently there was little or no malaria in the neighbourhood. Out of seven varieties of mosquitoes, *Anopheles punctipennis* was the only Anopheline. The others were : (a) *Culex pipiens*, (b) *Culex saxatilis*, (c) *Aedes sollicitans*, (d) *Aedes sylvestris*, (e) *Psorophora ciliata*.

The preventive measures followed the usual lines, namely ditching, oiling, and filling up.

A method not usually found in works on the subject, the use of nitre cake, is described. If ordinary commercial nitre cake is added to water up to about 7 per cent. salinity, this destroys the larvae of *Aëdes sollicitans* in three days.

The writer says that the method has not a very wide application, and is expensive.

The illustrations show that the difficulties were considerable, principally owing to the size of the area which had to be treated.

PRICE (T. A.). **Control of Mosquito Infestation in City Areas.**—*Australasian Med. Congress. Transactions of the Eleventh Session held in Brisbane, Queensland, 21st-28th August, 1920.* pp. 280-282.

The writer gives a description of measures necessary to get rid of *Culex fatigans* and *Stegomyia fasciata* from Toowoomba, in Queensland, Australia. Apparently the place is not extremely malarious, but suffers a good deal from mosquito prevalence, which has caused outbreaks of dengue fever. He puts the cost of a recent epidemic of this disease at half a million sterling, apart from the loss of life. He points out that the money expended in unsatisfactory methods of extermination is largely wasted, and recommends a thoroughly sound scheme for treating collection of water, swamps, etc., in the town. He outlines the organization necessary as follows:—

“ 1. Survey by competent man to define area, and state the general problem (should be supplied by Health Department).

“ 2. Area defined should be placed under the control of the local M.O.H. (Unnatural divisions should be abolished.)

“ 3. A trained mosquito inspector should be appointed and given full charge of the work responsible to the M.O.H.

“ 4. The city area should be divided into three sections:—

    (a) All swamps and other places requiring spraying.

    (b) A central area to be frequently inspected.

    (c) Outlying area to be regularly inspected at less frequent intervals.

“ 5. It is necessary, even with the fullest co-operation of the citizens, to have at least one inspector to every 5,000 inhabitants. In the more favoured drier towns in the wetter districts, more men would be necessary—office staffs to keep records and issue notices, etc.

“ 6. The work must be continuous, otherwise mosquitoes will return.”

Unfortunately, the writer lays himself open to the criticism that he does not give the cost of these measures. Consequently it is impossible to say whether the community could afford to get rid of these pests or not.

MINETT (E. P.). **Use of Town Refuse for Mosquito Work.** [Personal Communication.]

In the Sanitation Supplement of March 30, 1921, we published some pictures of reclamation of street drains with town rubbish in Georgetown, British Guiana. Figures 60 and 61 illustrate the same process. Figure 60 shows a roadside drain with a large amount of grass in which mosquitoes breed plentifully; Figure 61, the same drain filled with street rubbish and covered with earth. An important point to be insisted on is that each day's rubbish must be covered immediately with earth; otherwise the process breeds millions of flies. The earth in Georgetown is particularly suitable for this work, being a sort of tenacious clay, which effectually stops the hatching out of fly pupae.



FIG. 60. Showing roadside drain at Georgetown with large amount of grass in which mosquitoes bred plentifully.



FIG. 61. Showing the same drain filled with street rubbish and covered with earth. [Reproduced from photographs kindly supplied by Dr. E. P. MINETT.]

PURDY (J. S.). **The Control of Insect Vectors of Disease in War and Peace.**—*Australasian Med. Congress. Transactions of the Eleventh Session held in Brisbane, Queensland, 21st-28th August, 1920.* pp. 298-306.

The writer saw a good deal of service during the war, and gives an interesting account of his experiences in the prevention of flies in camp and the disinfection of the body, clothing, and quarters of men under service conditions. The measures recommended follow lines which are well known, and have been very much to the fore within the last five or six years. A formula for the manufacture of tanglefoot is given, namely, five parts of castor oil and eight parts of powdered resin heated together until the resin is dissolved. The mixture should be spread on the strips of paper whilst hot. It is desirable to cook this mixture in the open air, because ignition of the contents of the saucepan is not an uncommon accident.

WOLLMAN (E.). **Le rôle des mouches dans le transport des germes pathogènes étudié par la méthode des élevages aseptiques.**—*Ann. Inst. Pasteur.* 1921. Vol. 35. No. 7. pp. 431-449. With 3 text figs.

The experiments made by the author show that domestic flies contaminated with pathogenic germs (typhoid and Shiga), kept in gauze bags, remain infective for periods as long as 22 days. Under normal conditions the flies free themselves from the infection in 8-10 days. The bacteria eliminated with the dejecta or regurgitated liquid are living and capable of starting disease.

DELANOË (P.). **Au sujet d'un piège à puces.**—*Bull. Soc. Path. Exot.* 1922. Jan. 11. Vol. 15. No. 1. pp. 39-41.

The writer was forced to pass the night in a portion of the hospital where, during the day, Arab out-patients were treated. Naturally the Arabs had to remove their clothes for medical examination, and each individual left a contribution to the number of fleas in the room. The author was unable to sleep in consequence of their abundance, but constructed a simple flea trap, which rid the room of the pest in a short time.

A plate is placed on the floor and filled with oil, in the centre of which is an ordinary night-light. When the night-light is lit, the fleas are attracted to it, jump towards it, and fall into the oil bath. The windows and doors must be carefully shut, so as to exclude all light.

The writer describes having caught as many as 1,171 fleas in four consecutive nights, which averages about 300 per night. He has on other occasions caught as many as 500.

The trap is evidently extremely simple to work and construct, but it has certain limitations, namely, that in a room filled with bedding, curtains, and floor mats it would not work, as the fleas remain in the folds of these materials. It will also fail if light gets into the room from outside.

MITCHELL (J. Alexander). **Plague in South Africa : Perpetuation and Spread of Infection by Wild Rodents.**—*S. African Med. Rec.* 1921. Dec. 24. Vol. 19. No. 24. pp. 475-477; and *Jl. of Hyg.* 1921. Dec. Vol. 20. No. 4. pp. 377-382.

Plague was introduced into South Africa by ships' rats in the Boer War, 1900-02, infection persisting till 1905. In 1906-11 there was no plague in the country. In 1912 it was re-imported. In 1914 virulent

pneumonic plague broke out in the Tarka district of Cape Town, spreading to neighbouring districts. From this time similar outbreaks continued, affecting in 1916, and again in 1918, Hoopstad and Potchefstroom, and Kroonstad in 1920. All these outbreaks were similar; there was no evidence of human conveyance. No rats could be found in the houses, and consequently it was argued that some other agent must be engaged in disseminating the disease. A careful investigation was therefore made into the local fauna.

"It was found that the gerbille, or 'nachtmuis' (*Gerbillus taterona*), was very numerous in many parts of the area, also the multimammate mouse (*Rattus coucha*), the large eared mouse (*Malacothrix typicus*), and the striped mouse (*Arvicathus pumilio*), together with the yellow mongoose (*Cynictus penicillata*), the ground squirrel (*Geosciurus capensis*), and the suricat or true meercat."

On careful investigation it was found that plague cases closely followed the distribution of the first two of these mammals.

"The habits of the gerbille are purely nocturnal, so that they are rarely seen by man; also, they rarely or never enter dwellings. They are gregarious and migratory, and often travel long distances at night, either singly or in parties. The almost complete destruction of jackals, lynxes, and cats and the great development of mealie-growing have created conditions exceptionally favourable to wild rodents in this part of the Free State. The place of the ordinary domestic mouse is taken by the multimammate mouse, which lives sometimes in gerbille burrows and sometimes in dwellings or outbuildings, or, again, it may alternate between the two. It is a lazy animal, never travels far, and prefers any cover, or the hole or burrow of some other animal, to digging a hole for itself. . . ."

"In February last the owner of the farm 'Grootdraai,' close to Bothaville, and about eight miles from 'Angra Pequina,' became ill and died of plague. Around his homestead were a number of gerbille burrows, but the inmates of these were healthy. For a week or ten days before the onset of his illness the farmer had been ploughing on lands some three miles from the dwelling, and was wont to have a mid-day siesta under the shade of a clump of bush near by. This locality was searched, and several recently dead gerbilles and multimammate mice were found on the ground surface; there was also a large colony of burrows. These were excavated, and a total of eight dead gerbilles found, the remainder having evidently migrated. There were also found between 350 and 400 multimammate mice, of which 150 were recently dead and 100 were obviously sick; the remainder were kept in captivity, and most of them died during the succeeding week. Specimens of the dead gerbilles and multimammate mice, and also of the mice which died in captivity later on were sent to the South African Institute for Medical Research, Johannesburg, and found to be plague-infected."

*List of Fleas collected from Wild Rodents and Small Carnivora in North-Western Free State.*

Animal Host.	Fleas.
<i>Tatera Lobengulæ</i> (Gerbille) ..	<i>Dinopsyllus lypusus</i> .
	<i>Xenopsylla eridus</i> .
	<i>Listropsylla stygus</i> .
<i>Rattus coucha</i> (Multimammate mouse). ..	<i>Dinopsyllus lypusus</i> .
	<i>Echidnophaga larina</i> .

*List of Fleas collected from Wild Rodents and Small Carnivora in North-Western Free State—continued.*

<i>Rattus rattus</i>	..	..	..	<i>Xenopsylla cheopis.</i>
<i>R. rattus fruginis</i>	..	..	..	<i>Xenopsylla brasiliensis.</i>
<i>Arvicanthus pumilio</i> (Striped mouse)				<i>Dinopsyllus lypusus.</i>
				<i>Xenopsylla eridus.</i>
<i>Laggada</i> sp.	..	..	..	<i>Chiastopsylla octavii.</i>
<i>Malacothrix</i> sp.	..	..	..	<i>Listropsylla stygius.</i>
<i>Steatomys</i> sp.	..	..	..	<i>Dinopsyllus lypusus.</i>
<i>Xerus (Geosciurus) capensis</i> (Ground squirrel).				<i>Listropsylla stygius.</i>
				<i>Xenopsylla isidis.</i>
<i>Cynictus penicillata</i> (Yellow mongoose).				<i>Echidnophaga bradyta.</i>
				<i>Echidnophaga gallinacea.</i>
				<i>Ctenocephalus canis.</i>
<i>Pedetes caffer</i> (Spring hare) ..	..	..		<i>Echidnophaga bradyta.</i>
<i>Suricator suricator</i> (Suricat or True Meercat).				<i>Xenopsylla isidis.</i>
				<i>Echidnophaga gallinacea.</i>
				<i>Listropsylla stygius.</i>
				<i>Xenopsylla nov. sp.</i>
				<i>Ctenocephalus canis.</i>
				<i>Echidnophaga gallinacea.</i>

MEDICAL JOURNAL OF AUSTRALIA. 1921. Dec. 24. 8th Year. Vol. 2. No. 26. pp. 612-614.—**The Plague Conference.**

The delegates who attended this Conference consisted of all the Chief Health Officers in the Local Government of Australia. The findings therefore represent the opinion of a committee of experts.

The report simply gives a copy of the various resolutions passed by the Conference. It is obvious that these do not lend themselves to summary, because the exact wording of the various conclusions is of great importance. The resolutions do not contain anything very new; but those dealing with the subject of rats, rat-catching, and the rendering of buildings rat-proof, are worth publishing *in extenso*, as they may serve as useful guides to other authorities desirous of legislating on this very important subject.

*Intensive Rodent Destruction.*

“ 1. That the following draft regulations are approved by the Conference as representing the minimum standards for regulations relating to the control of plague, which should be adopted and enforced by all States in view of the plague situation as it is to-day in Australia.

“ The Conference is of opinion that in any State in which the existing legal powers are inadequate for the enforcement of such regulations, the necessary legal powers should without delay be obtained from Parliament.

“ (i) No owner or occupier shall place, throw, leave, or suffer to remain on his premises any waste food, refuse, garbage, waste matter or thing which would have a tendency to encourage or attract rats to visit or frequent premises or to form or to afford harbourage or shelter to rats.

“ (ii) Whenever upon any premises any litter, hay, straw, packing material, manure, building material, produce, timber, bags, tins, old iron, paper, packing cases or similar material is kept or stored in such a way as to afford or form shelter or harbourage for rats, it shall be removed or so stacked, stored, arranged or protected as to no longer afford or form shelter or harbourage for rats.

“ (iii) No waste food, garbage, edible trade waste, horse-feed, or cow-feed, food intended for birds or other animals or similar material shall be

kept or allowed to remain on any premises unless it is contained in rat-proof receptacles or compartments which are kept effectively covered or closed against access by rats.

" (iv) Every opening from or into any covered drain or sewer within the curtilage or any premises and every opening from or into any pipe, covered conduit, or covered channel (whether or not used for drainage) which affords or is likely to afford access, shelter, or harbourage for rats, shall be so trapped or otherwise protected as to prevent effectively the ingress or egress of rats.

" (v) Every disused covered drain, disused covered sewer, disused pipe, disused covered conduit or disused covered channel within the curtilage of any premises which affords or is likely to afford access, harbourage, or shelter for rats, shall, upon notice to that effect being given by the

to the owner or occupier of the premises, be taken up, repaired, blocked or otherwise so dealt with in the manner specified in such notice as to effectively prevent the access, harbourage, or shelter of rats therein.

" (vi) Whenever in any building the floors, skirtings, wainscots, walls, partitions, ceilings or like internal fittings or any of these are so constructed or are in such a condition as to permit the access, shelter or harbouring of rats in, under or about such building, the said floors, skirtings, wainscots, walls, partitions, ceilings or like internal fittings shall be so removed, refitted, reconstructed, altered, or repaired as to prevent as far as practicable the access, shelter, or harbouring of rats in, under, or about such buildings.

" (vii) Every retaining wall, embankment, structure, improvement or work of any kind or any formation, whether natural or artificial, within the curtilage of any premises, which affords or provides or is likely to afford or provide the means of access, harbourage, or shelter for rats, shall, in accordance with an inspector's order, be removed or so reconstructed or repaired or altered as to prevent the access, harbourage, or shelter of rats.

" (viii) Every hotel, restaurant, butcher's shop, small-goods shop, baker's shop, grocer's shop, fruit shop, fish shop, oyster saloon, produce store, hide store, flour mill, stable and slaughter-house shall be so protected, altered, or refitted in accordance with inspector's orders as to effectively prevent rats from gaining access to or harbouring in, under or about the building or buildings thereof. All holes or openings in the external walls of such buildings which are of such a nature as to permit the entry of rats, shall be blocked with cement or protected with stout wire netting or metal in such a manner as to effectively prevent the entry of rats. All supplies or collections of water to which rats may have access in or on such premises, shall be so protected as to effectively prevent such access.

" (ix) For every hotel, restaurant, butcher's shop, small-goods shop, baker's shop, grocer's shop, fruit shop, fish shop, oyster saloon, produce store, hide store, flour mill, stable, and slaughter-house there shall be provided at least two rat traps of a pattern approved by the , or as many more as may be required from time to time by the . Every such trap shall be baited with fresh bait at least twice in each week and shall be kept set. Every such trap shall be inspected daily by the owner or occupier or his agent or servant and all rats found therein shall be killed and their carcasses forthwith disposed of so as not to cause a nuisance, and the trap or traps re-set and re-baited by the said owner or occupier or his agent or servant.

" (x) In addition to the foregoing every owner and occupier shall use all reasonable means by blocking access ways, destroying harbourage, protecting foodstuffs, poisoning, trapping, the use of rat-killing dogs, cats or other animals and otherwise to keep the premises occupied by him free from rats and to prevent and discourage the access to or harbouring of rats in, on or about such premises.

" (xi) All public and private docks and wharves, including all sheds and other buildings thereon, shall be so protected as to prevent rats from gaining entrance to such docks or wharves, or sheds or buildings at any

state of the tide from vessels moored or anchored alongside of such docks or wharves or from other sources, and all goods, products, wares and merchandise liable to attract or to become infested or infected with rats on any dock or wharf, shall be so kept or stored as to prevent rats from gaining access to or coming into contact therewith.

" Every dock or wharf shall be provided with not less than traps of a pattern approved by an authorized officer and as many more as may from time to time be required by any authorized officer. Every such trap shall be baited with fresh and suitable bait at least twice a week and shall be kept set. Every such trap shall be inspected at least once daily by the owner or occupier or his agent or servant and all rats found therein shall be killed and their carcasses shall be forthwith disposed of in such manner as the may from time to time require and the trap or traps re-set and re-baited by the said owner or occupier or his agent or servant.

" (xii) The presence of rat holes, rat runs, fresh rat dung or other evidence of rat infestation upon any premises, dock, wharf, land or place shall be taken as evidence that these regulations have not been complied with and shall be held to constitute a breach of these regulations.

" It shall be the duty of every owner and occupier to comply with the foregoing regulations at his own expense and to continue such compliance during the continuance of such regulation. If any owner or occupier makes a default in compliance with any of the provisions of the foregoing regulations the may, by himself or any officer or person authorized by him, whether specifically or generally to such end, enter upon the premises at any time and cause the regulations to be complied with in all respects. Any expenses incurred by the in so doing may be recovered by him by summary proceedings before a magistrate and in addition such owner or occupier shall be liable to a penalty not exceeding £50.

" (Where blanks appear the name of the appropriate authority should be inserted.)"

**ELKINGTON (J. S. C.). A Review of Recent Literature and Work on the Epidemiology of Plague.**—*Commonwealth of Australia. Department of Health. Service Publication No. 5. 1921. 2nd Edition. 44 pp.*

This is a second edition of the pamphlet published by the Health Department of the Commonwealth of Australia. As its title suggests, it gives a brief abstract of all literature on the subject of plague prevention, dealing, of course, with such subjects as the varieties of rats, rat poisoning, rat trapping, and also with the bionomics of the rat fleas. As practically all the papers referred to have been reviewed in this *Bulletin* at one time or another, it is unnecessary to go over the ground again. For the purposes of reference the pamphlet should be in the hands of all officers dealing with outbreaks of plague.

**ELKINGTON (J. S. C.). Plague Control in other Countries.**—*Med. Jl. Australia.* 1921. Dec. 3. 8th Year. Vol. 2. No. 23. pp. 502-504.

The writer gives an interesting summary of the measures against plague during the last twenty-five years, taken by the various Governments in different parts of the world.

He deals with the San Francisco outbreak and the measures used to stamp out the disease in that town, with the work in Java by the Dutch authorities, with the measures used in American seaport towns, and all other important outbreaks.

As all these manifestations of plague have been described at different times in this *Bulletin*, there is no necessity for further reference. Any one wanting a brief summary of recent activities would do well to consult this paper.

**WU LIEN TEH [TUCK (G. L.)]. Practical Points in the Treatment of Plague.—*Lancet*. 1921. Oct. 22. pp. 853-854.**

The title of this paper is very misleading. There is very little about the treatment of the disease, but the epidemiology of the outbreak in Manchuria in 1920-21 is dealt with at some length. As this manifestation was largely pneumonic in origin there is no necessity to give the actual details of its spread.

Very strict measures were in force to prevent travelling. The third class traffic from Harbin to Changchun was cut down to 150 a day, and the passengers were inspected and kept in detention five days before being allowed to travel. It is claimed that "although the number of deaths at Harbin was considerable, comparatively few cases occurred south of this city. For instance, the whole of Changchun district only claimed 77 deaths from plague, and Mukden only four deaths, as compared with 5,000 deaths in each city during the epidemic of ten years ago. The population of Manchuria had increased from 12 millions to 22 millions, while that of Harbin had jumped from 70,000 to 300,000 during the intervening ten years. Whereas at least 50,000 plague deaths were recorded in 1910-11, only 8,500 persons died in the epidemic of 1920-21."

Then follow a series of interesting queries, the replies to which are arrived at by bacteriological investigation on the spot.

1. How did pneumonic plague originate? Reply is, that it started as bubonic, passed into septicaemic and then finally became pneumonic.

2. Wherein does the real danger of the plague lie? Reply, in the expectoration of the patient coughing. The droplets seldom travel more than three feet, but in badly ventilated places this does not apply.

3. Is the cotton gauze mask efficacious against plague? Yes, if it is properly worn.

4. Is the air in the sick room infective? The writer made some very inconclusive and unsatisfactory experiments with rabbits and guinea-pigs, the results of which would be worth very little.

5. Why did so many burial coolies die in this and the previous epidemic? Answer, because they stole the clothing of the corpses.

6. What action do the best known antiseptics have on plague sputum? Carbolic, lysol, sublimate, permanganate of potash, hydrogen peroxide, alcohol, methylated spirits, cresol, were tried. The bacillus was found to be resistant and no exact details are given as to strength required.

7. What is the best way of disinfecting plague houses? Reply given is, fumigation with sulphur gas after spraying the walls with water.

**WU LIEN TEH. The Second Manchurian Plague Epidemic. Appendix to Eighth Annual General Report.—*Nat. Med. Jl. China*. 1921. Dec. Vol. 7. No. 4. pp. 246-249.**

The writer gives a brief description of the second plague epidemic in Manchuria which, like the first, appears to have been largely pneumonic in character.

The population of Manchuria has increased from twelve millions to twenty-two millions in ten years, and Harbin from 70,000 to 300,000.

In the recent epidemic, in 1920-21, 8,500 people died of the disease in the Manchurian area, whereas in the first outbreak the deaths certainly numbered 50,000. Sixty thousand antiplague gauze masks and 8,000 doses of antiplague vaccine was distributed from the central laboratory.

**BOMBAY.** *Fifty-seventh Annual Report of the Sanitary Commissioner for the Government of Bombay, 1920, with Appendices, including the Annual Report of the Sanitary Board, Bombay Presidency, and the Annual Reports of the Health Officers of the Ports of Bombay, Karachi and Aden.* [MURPHY (W. O.'S.), San. Commissioner for the Govt. of Bombay.]—35+57 pp. With 1 chart. 1922. Bombay: Printed at the Govt. Central Press. [Price Re.0. 15. 6.]

“*Rat Poison.*—Further experiments to arrive at specifications for commercial barium carbonate as a rat poison tend to show that (in addition to being free from repellents such as sodium carbonate, barium sulphide, &c.), 80 per cent. is the minimum content of pure barium carbonate that should be demanded.

“The addition of a weak boric (1 in 40) or carbolic (1 in 40) lotion to dough used as poison medium preserves the attractiveness of the bait. After three days' keeping such baits, though less attractive than freshly prepared dough, are many times more attractive than untreated bait of the same age.

“*Traps.*—Samples of a grip trap, known as the ‘Zip,’ showed a very high efficiency in catching—equal to more than twice that of the improved French cage trap pattern under laboratory conditions. The use of a trap of this pattern is indicated towards the finish of a vigorous rat campaign.

“The effect of oiling, handling, &c., on the attractiveness of traps for rats was investigated in series of experiments. Taking the efficacy of control (untouched) traps at 100, the smell of the human hand reduces the figure to 79; smearing with vaseline to 30, and with oleum arachis hypogea (oil of ground nut) to less than 20.

“The advantage of traps with the flap provided with a counterpoise, as compared with a flap actuated by a spring was shown to be in the ratio of 100 to 53.

“It is of interest to note that the opinion arrived at in the laboratory after prolonged and careful experiments in previous years (see Report for 1919) as to the relative efficiency of the ‘Wonder’ trap (as modified and improved at the laboratory) over other patterns of cage trap were confirmed under natural conditions in the work of the Belgaum-Dharwar Plague Operations.”

**URIARTE (Leopoldo).** *Profilaxis de la peste de Orient. Las ratas y los depósitos de mercaderías.*—*An. del Depart. Nac. Hig. Buenos Aires.* 1920. Sept.–Oct. Vol. 26. No. 5. pp. 293–318. With 4 text figs. & 20 illustrations. [Summarized in *Bull. Office Internat. d'Hyg. Publique.* 1921. July. Vol. 13. No. 7. pp. 734–737. With 4 text figs.]

This is a useful paper. The figures show some effective ways of storing bags of grain on temporary structures.

The first is made of masonry pillars 60–80 cm. high. The surrounding wall is corrugated iron, 55 cm. in height, fastened on to metal tubes. This is inclined at an angle of 55° to the horizon.

The second model is like the first in all respects, except that the masonry platform is put or placed on the ground instead of on pillars.

The third is made of a plank platform surrounded with a corrugated iron fence standing on trestles.

The fourth is the simplest of the lot, being a wooden floor placed on the ground, the iron fence being sunk into the soil to a depth of nearly a metre.

## METHODS OF STACKING BAGS OF GRAIN.

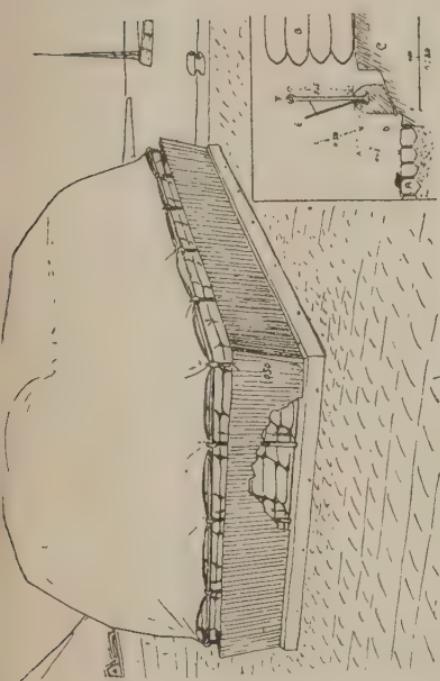


FIG. 62. Stacked on solid platform of cement raised 60 or 80 cm. above ground on strong masonry piles. Galvanized iron sheeting, inclined outwards at an angle of 55° from the horizontal, is placed round the platform to form a 1.5-m. high wall 55 cm. high. The sheeting is attached to metal tubing. The sheeting is placed round the platform as in fig. 62.

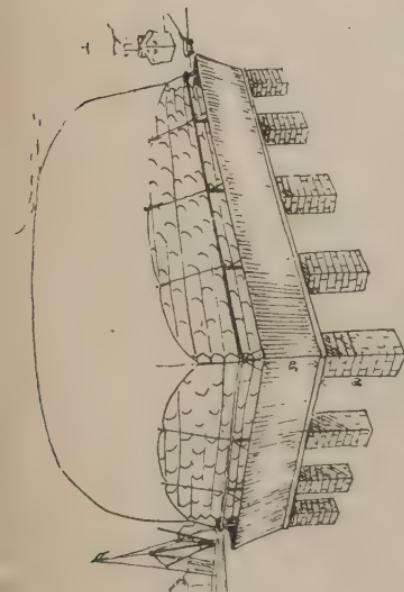


FIG. 63. Stacked on slightly raised concrete bed set into ground. Galvanized iron sheeting is placed round the platform as in fig. 62.

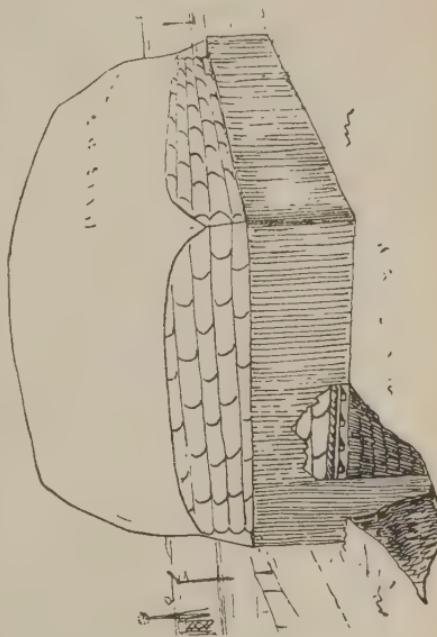


FIG. 64. Stacked on plank flooring raised on trestles. Galvanized iron sheeting is placed round the stack. The trestles stand on a bed of concrete or similar material.

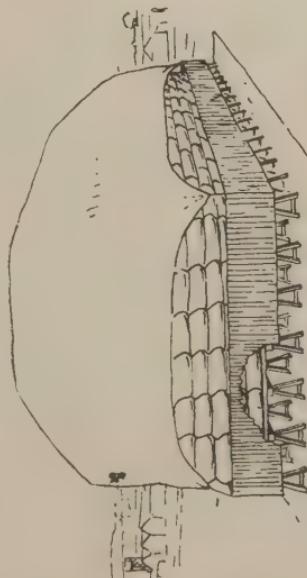


FIG. 65. Stacked on plank flooring placed on the ground. Galvanized iron sheets are erected vertically to form a rat-proof wall 80 or 90 cm. high and sunk a similar distance into the ground.

SPENCER (R. R.). **A Note on the Natural Immunity of Wild Rats to Plague.**—*Public Health Rep.* 1921. Nov. 18. Vol. 36. No. 46. pp. 2836-2838.

“Cutaneous inoculations with plague of 57 rats from a non-infected territory [Mobile, on the Gulf of Mexico] showed 43.8 per cent. to be immune.

“Subcutaneous inoculation with plague, of 377 rats from a non-infected locality, showed 30.2 per cent. to be immune.

“A total of 434 rodents from a non-infected locality showed 32 per cent. to be immune.”

#### *Conclusion.*

“A very considerable percentage of the wild *M. norvegicus* from a non-infected locality has been found to be immune to plague.”

BAHAMAS. **Annual Report of the Chief Medical Officer** [PEARCE (A. H. B.)] together with the Reports on the following Departments of the Medical Service of the Colony, viz.: The Bahamas General Hospital and the Prison, for the Year 1920, and the Financial Year ending 31st March, 1921.—31 pp. [Received from the Colonial Office.]

*Epidemics.*—“As usual, typhoid fever was the most serious disease that occurred in epidemic form in the Colony for the year. This disease broke out . . . . in Spanish Wells in February and continued until September. Hope Town, Abaco, was attacked by a similar outbreak, which was at its height during the months of June and July. As long as sanitation remains in such a primitive state in the Lotu Islands we must expect a recrudescence of these epidemics every summer.”

More investigation into the water supply is required, and inoculation of inhabitants.

MURPHY (W. A.). **An Epidemic of Dysentery in Mid-Glamorgan.**—*The Medical Officer.* 1922. Feb. 11. Vol. 27. No. 6. (No. 707.) pp. 59-61. With 1 text fig.

This paper contains a very interesting account of a truly water-borne epidemic of bacillary dysentery in Wales.

The facts are as follows. An epidemic of diarrhoea with tenesmus, mucus, and passage of blood-stained stools was reported to the Medical Officer of Health from Ogmore Vale about May 18 last. A bacteriological examination of the stools showed *B. dysenteriae* Flexner W. (Oxford series) to be present; 18 of 31 sera taken from patients suffering from diarrhoea clumped this organism in dilutions of 1 : 100 to 1 : 1,000. There was, therefore, no doubt as to the causal agent. Investigation into food and milk supplied showed that these could not have been the cause of the outbreak, so suspicion fell on the water. It was fairly obvious from the commencement that here was to be found the true explanation, because the cases were all confined to one area having a similar water supply, and the early cases occurred in a manner well known to be significant of a mass infection.

The water supply consisted of two intakes, both bad from a sanitary point of view. One, the Fairy Glen intake, came from a stream that was known to be polluted, and was not filtered. Early cases only occurred where the Fairy Glen water was distributed. The second

intake supplied another part of the valley that was only infected secondarily. In the Fairy Glen supply area were three small areas with independent supply; the inhabitants in these had very few cases indeed. The three cases that did occur were school children who went to a school where the Fairy Glen supply was available.

On May 7 and 8 there was a heavy downpour of rain after drought. "Enquiry into the dates of onset of the first 327 cases showed that no cases occurred prior to May 10, three between May 10 and 13, and the heaviest incidence, 50 per cent. of the earliest recorded cases, occurred during the four days May 12, 13, 14 and 15, the date of onset in 28 cases being May 12, in 82 cases May 13, in 24 cases May 14, and in 24 cases May 15.

"From May 16 to 19 the number of persons attacked was relatively high, 20 cases giving the date of onset as May 19, there being 63 cases in all attacked between these dates."

"The results, worked out on a population basis, show that in the western area 578, or 23 per cent. of the inmates, were attacked, whereas in the eastern area 133, or 7.2 per cent., and in the Gorwyl area (with an independent water supply) 3, or 1.4 per cent. of the inmates, were attacked."

Secondary infection accounted for several cases occurring in the area where the water was good. This is what one would expect in bacillary dysentery.

It is very rare to obtain such a definite water-borne outbreak of bacillary dysentery. In the tropics the disease is so infectious that sanitarians consider personal contact, flies, with deficient conservancy the usual method of spread. It is satisfactory to have definite proof that polluted water can also be the cause of an outbreak.

LAKE (G. C.) & FRANCIS (Edward). **Tularaemia Francis, 1921. VII.**

**Six Cases of Tularaemia occurring in Laboratory Workers.—**

*Public Health Rep.* 1922. Feb. 24. Vol. 37. No. 8. pp. 392-413. With 2 charts.

Six laboratory workers who have been studying tularaemia have contracted the disease. Two of these workers are physicians, one of whom has contracted the disease twice.

The studies into the cause and transmission of the disease show it to be due to a germ, *Bacterium tularensis*, which is conveyed by six different insects: the blood-sucking fly, *Chrysops distalis*; the stable-fly, *Stomoxys calcitrans*; the bed-bug, *Cimex lectularius*; the squirrel-flea, *Ceratophyllus acutus*; the rabbit-louse, *Haemodipsus ventricosus*; and the mouse-louse, *Polyplax serratus*. Only the first four of these are known to bite man. It appears possible that the germ may also enter through unbroken skin; for instance, that of the hands.

ARMSTRONG (Charles). **Typhus Fever on the San Juan Indian Reservation, 1920 and 1921.** —*Public Health Rep.* 1922. Mar. 24. Vol. 37. No. 12. pp. 685-693.

The writer gives an account of an outbreak of typhus fever amongst Navajo Indians in the Reservation of New Mexico, Arizona and Utah. The population is scattered over a large area of semi-desert country, with an average of one person to every square mile, all more or less

infested with lice, which are accepted as the ordinary condition of life. The epidemic probably arose from itinerant labourers crossing the reservation on their way to the mining region of Utah and Colorado.

Early cases were certainly not diagnosed ; probably the first occurred in November, 1920 ; cases continued to occur in the first six months of 1921. The disease was frequently spread by the "medicine man," who went to "sing" over patients ; altogether there were 63 cases, with 27 deaths.

Great difficulties were encountered in delousing the persons, clothing, and shelters of this tribe of Indians, because little or nothing was available in the country itself. The earliest measures consisted in disinfecting the clothes, painting the individual with distillate (50 per cent. coal oil and 50 per cent. gasoline), and washing the hair with a mixture of vinegar and distillate. These measures raised a good deal of objection, and caused a certain amount of skin disease. Eventually more satisfactory methods were used, consisting of hot baths and a soap prepared as follows : 1 part of soap chips, 4 parts of water, and 2 parts of kerosene. Clothes were sterilized by an ordinary steam sterilizer, and the skin was washed in a solution of nicotine sulphate (1 in 1,000) at a temperature of 100° F. The Indians themselves gradually appreciated the cleanliness and freedom from body lice, the campaign having a decided educative effect.

**GRENADA. Report of the Colonial Surgeon on Intensive Treatment of Yaws for the Half-Year ended 31st December 1921.**

[PATERSON (G. W.), Colonial Surgeon.]—4 pp. [MS. Report received from the Colonial Office.]

" Number of cases discharged cured to date .. ..	8,984
" Total number of cases injected to date .. ..	10,686
" Total expenditure for treatment at date .. £6,265 1s. 5½d.	

" The average cost of each case discharged cured from May, 1919, to December, 1920, was 19s. 11½d. That for the period May, 1919, to June, 1921, was 16s. 4½d., and for May, 1919, to December, 1921, 13s. 6d.

" There is consequently a reduction of 6s. 5½d. in the cost of treatment of each case."

**MEDICAL JOURNAL OF AUSTRALIA.** 1922. Feb. 11. 9th Year. Vol. 1. No. 6. pp. 148-152.—**An Historical Account of the Occurrence and Causation of Lead Poisoning among Queensland Children. Drawn up for and endorsed by the Council of the Queensland Branch of the British Medical Association.**

This is an extremely interesting article on an outbreak of lead poisoning amongst children, which has been going on in Queensland since 1891-2.

In the early days of the outbreak the diagnosis was by no means certain, but a careful study of the symptoms and analysis of the urine proved that lead was the cause.

The author gives a very careful description of the symptoms. These we do not propose to say much about ; in every case, however, foot-drop appeared before wrist-drop ; colic and vomiting have been reported, and eye symptoms are not infrequent.

In 1897, 24 cases, mostly with colic symptoms in children between four and eight years, were reported ; in 1904 four cases were described,

one giving 0.44 mgm. per litre, another 0.32 mgm. of lead in the urine.

A paper in 1905 describes 200 cases of plumbism recorded at the Brisbane Hospital for Sick Children. In 1908 and 1909 the number had reached 262, and some 20 children per annum were admitted with this complaint.

There was at this time no doubt as to the diagnosis ; the trouble was to explain (1) why cases were confined to children ; (2) why the disease occurred in Brisbane and towns in Queensland and not in rural areas ; (3) why the disease was common in Queensland and not in other parts of Australia ; (4) why occasionally several members in a family were infected, but frequently only one, the others remaining immune.

A careful survey of the water supply of the houses showed that the roofs were of galvanized iron, fastened on with lead nails, with newly galvanized tanks which contained a certain amount of lead, but the lead that could be recovered from the water was so small in amount and so irregularly met with that water could not be incriminated as causal agent.

Eventually, after a long and careful enquiry, it was discovered that most of the houses were painted with ordinary lead paint, that the paint inside the house was hard and dustless, but that that applied to the palings and walls and on the verandah frequently became extremely powdery and easily detached from the wood, owing to the action of the sun and weather.

In the hot weather the children spent most of their days on the verandah, they frequently grasped the palings with their hands, and conveyed the lead dust of the paint into their mouths, by either biting their nails or sucking their fingers.

Another interesting point was that cases nearly always occurred shortly after onset of hot weather, when :—

1. The children were mostly on the verandah.
2. The heat of the sun made the paint more easily detached.

Appropriate legislation was passed to make it compulsory to use zinc paint for the outside of houses and on verandahs.

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## CONSERVANCY.

MACPHERSON (W. G.). **The Disposal of Latrine Contents, with Special Reference to Immediate Incineration.**—*Public Health.* 1922. Mar. Vol. 35. No. 6. pp. 142-149.

This paper deals with the advantages of rapid incineration of night soil as compared with trenching and other less satisfactory methods. It is hardly necessary for us to follow the author in his argument, because the war has shown that the above method is, under certain circumstances, superior to practically any other. The advantages claimed by the writer for the process are:—

- (a) Cleanliness, freedom from flies, and comparative absence of odour.
- (b) Definite area only involved and practically no soiling of the ground.
- (c) Only one sanitary attendant required.
- (d) Could be placed at a convenient distance from the men's living quarters without fear or offence.
- (e) Can be constructed with the materials usually available in any camp.
- (f) No special qualification necessary to enable it to be constructed; any intelligent N.C.O. was capable of erecting it within three or four days of arrival at the permanent camping site.

With these claims we are in entire agreement.

#### Activated Sludge.

Probably most medical officers in hot countries have only a very imperfect mental picture of what an activated sludge plant looks like.

In several of the Sanitation Supplements we have given plans and tables of purification results, costs, etc., but up to the present nothing in the nature of pictures has been available. The following illustrations, which were kindly lent by Messrs. Activated Sludge, Ltd., of 14, Howick Place, Westminster, show the mechanism in both large and small installations.

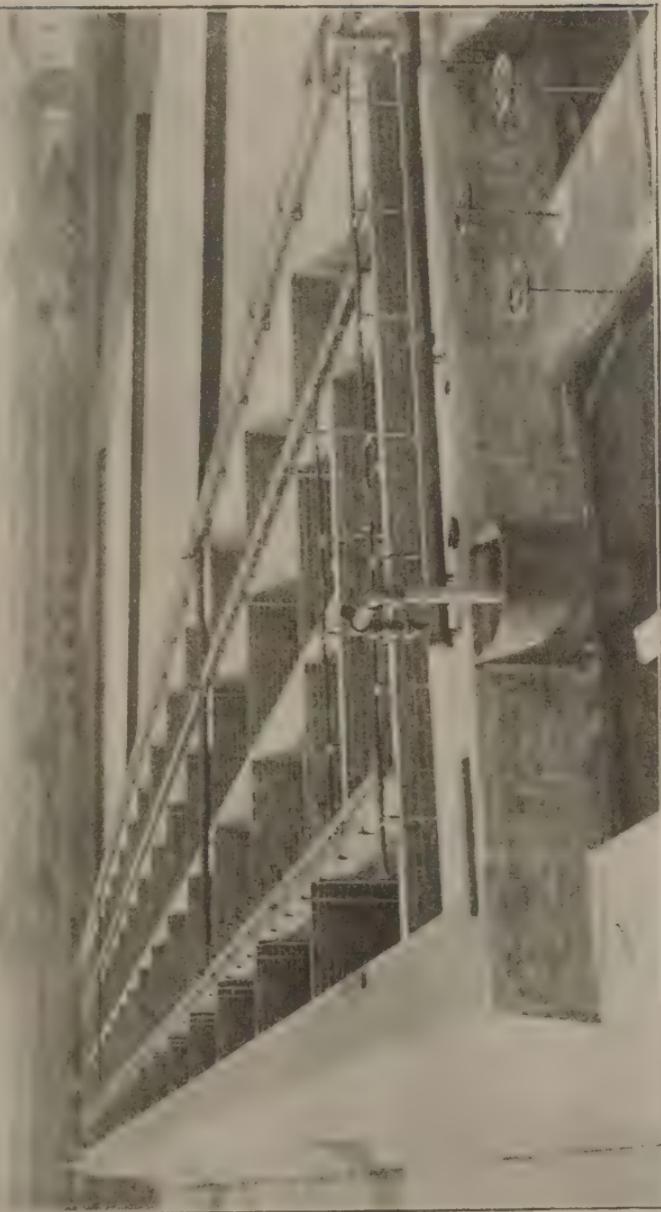


FIG. 66. Activated Sludge plant at Davyhulme, Manchester. A large installation treating 750,000 gallons per day of a strong domestic sewage.

For summary of results of working see this Supplement, No. 1, 1922, pp. 30-33.

[Blocks lent by Messrs. ACTIVATED SLUDGE, LTD.]

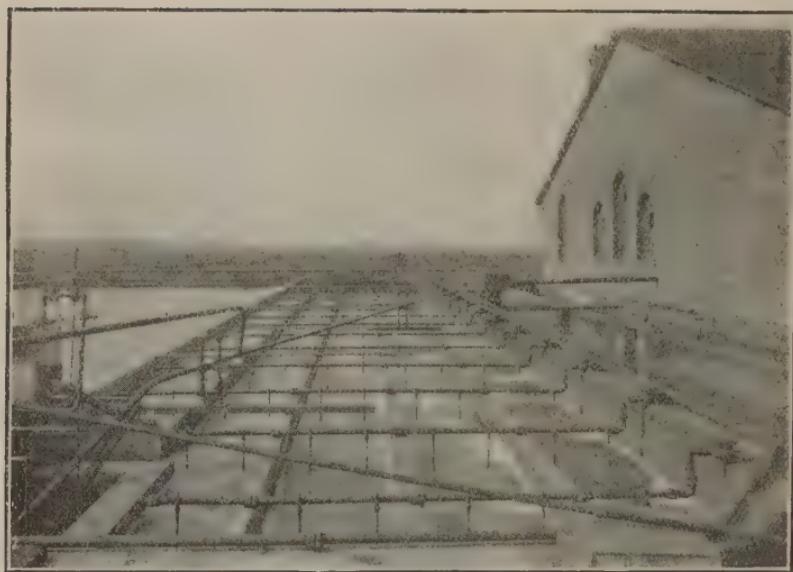


FIG. 67. Withington, Manchester.—Note the stirring action of compressed air. Plant treats 250,000 galls. per diem., 4 hours aeration, 82% purification, or 375,300 galls. per diem., 3 hours aeration, 86 % purification.



FIG. 68. Outlet end of Withington installation.

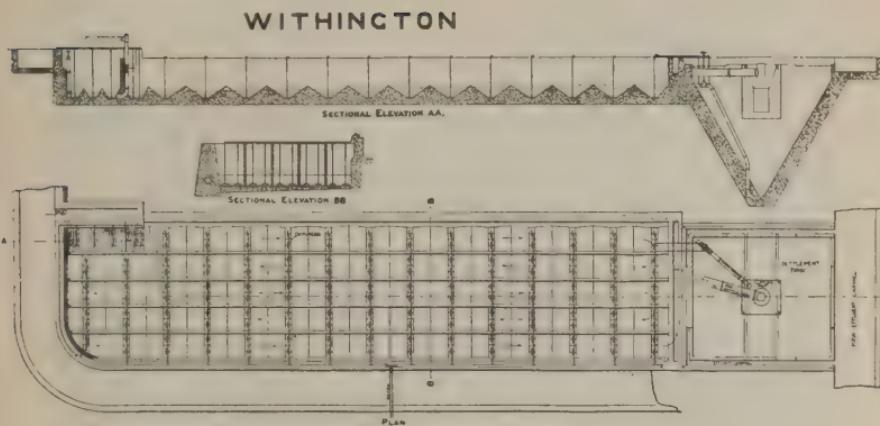


FIG. 69. Plan and sectional elevation of figure 67.



FIG. 70. Small installation—2,000 users—American Red Cross Hospital, Southampton. Outlet end.

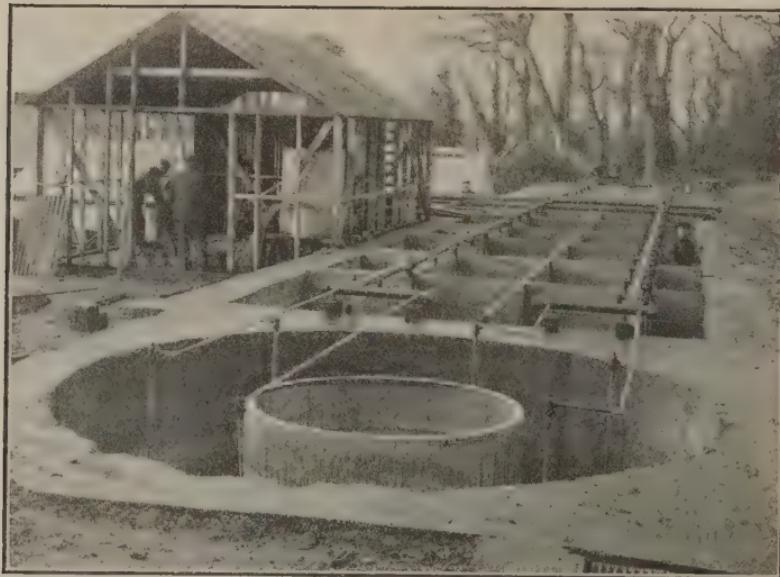


FIG. 71. Small installation—2,000 users—American Red Cross Hospital, Southampton. Inlet end.

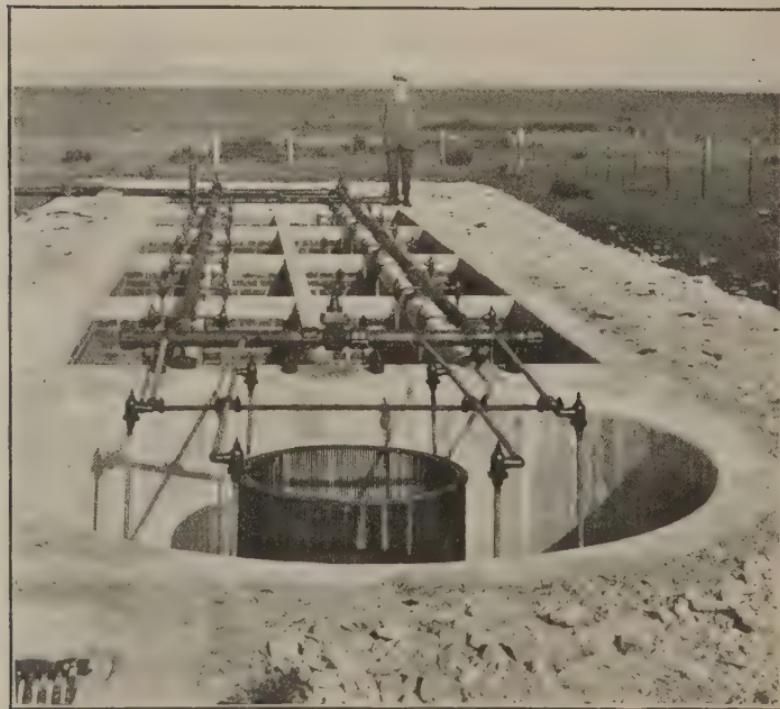


FIG. 72. Small installation—400 users per day—at Admiralty Airship Station, Moreton.



FIG. 73. Small installation—400 users per day—at Admiralty Airship Station, Moreton, showing compressor station.

MCVAIL (J. Borland). **Preliminary Note on Septic Tank Latrines in Relation to Hookworm Disease.**—*Indian Jl. Med. Res.* 1922. Apr. Vol. 9. No. 4. pp. 806-808.

The writer examined 107 specimens of septic tank effluent taken from 56 separate tanks provided for mill coolies on the banks of the Hoogli. In no less than 19 of these effluents eggs and larvae capable of transmitting hookworm disease were observed. In 15 samples, eggs of the ordinary round worm were observed, and in one, those of the tape worm. The majority of the specimens infected with hookworm were obtained from the tank direct, but in one instance the effluent that had passed through the ordinary trickling filter contained larvae.

Tanks that were overworked and filled with sludge gave more larvae than those that were in proper condition. The use of free chlorine, required by the Factory Act in order to sterilize the effluent, is not found sufficient to kill the larvae, though it is satisfactory in reducing the number of coliform bacteria. The question of designing a tank that would remove these larvae is under consideration.

Almost identical results were obtained by Dr. LEIPER from septic tanks in British Guinea during the visit of the Commission under his command. It is obvious, therefore, that the use of septic tank effluent as manure is fraught with a certain amount of danger of infecting the ground.

THE SURVEYOR & MUNICIPAL & COUNTY ENGINEER. 1922. Mar. 10. Vol. 61. No. 1573. pp. 221-222.—**Sewage Disposal in the Tropics. A Federated Malay States Project.**

" An interesting insight into the special problems which have to be faced in providing up-to-date means of sewage disposal in a tropical country is furnished by a report of Dr. Gilbert J. Fowler, in which consideration is given to the carrying out of a scheme for Kuala Lumpur, Ipoh, Seremban, and Klang, in the Federated Malay States. The report deals broadly with certain leading factors conditioning the whole question, and a number of recommendations are made for immediate action.

" In the first place, Dr. Fowler urges that a clear decision should be arrived at as to the necessity for a water-carriage system of sewerage. Objection, he says, may be taken on the score of expense and the lack of very clear evidence, from actual vital statistics, of the sanitary benefits to be obtained, but his personal view is that it is an inevitable demand based on the natural desire for greater cleanliness and amenity which accompanies a higher standard of living. In all the four towns which he has visited modern conditions of life prevail, and there is a growing percentage of pleasant residential bungalows, the life in which is impaired by the primitive methods of sewage disposal in use, which are often indeed less sanitary than those employed in the town areas. In the crowded town areas, provided a system can be devised which may be relied upon to function satisfactorily, the rapid removal of excreta and other noxious material from the vicinity of houses is manifestly greatly to be desired.

#### Water Supply.

" Dr. Fowler states that in all the towns which he visited the water supply appears to be ample or can be readily made so. The water in each case is derived from mountain streams impounded to a greater

or less extent. It is very soft, and from appearance should be of a high standard of purity, needing only to be filtered through a shallow layer of sand to remove floating particles, leaves, etc., in accordance with the present practice. At the same time, he suggests that it is highly desirable that regular analyses, and especially bacteriological examinations should be made, so that occasional pollution, due to weather or other conditions, may be quickly detected and steps taken to handle the situation and prevent its recurrence.

" Although the towns are thus fortunate in having an ample supply of good water, and are spared the expense of costly purification works, he makes it clear that every care should be exercised to ensure economy in the use of water if a water-carriage system of sewage disposal is adopted. Experience has shown that, unless special precautions are taken, great waste of water is likely to take place in town areas of the character met with in the Federated Malay States. In this connection he points out the necessity for metering the water, as far as possible, at every separate connection, and for the adoption of special devices to prevent the running to waste of water from taps. Apart from waste of water there is a natural increase in consumption which must be expected, once an ample supply of water is available, due to trade developments and the more lavish use of water for bathing, &c.

#### *Character of Rivers.*

" The rivers in Malaya which Dr. Fowler has seen are most of them somewhat shallow streams, flowing rapidly in tortuous channels and bearing a heavy burden of silt from the tin-mining areas.

" Little information, he states, exists as to the self-purifying power of these rivers in the event of sewage or sewage effluent being turned into them in quantity. Rivers such as those in China, the silt in which is derived mainly from the washings of agricultural areas, have, he continues, a remarkable power of oxidising any sewage which may be turned into them owing to the presence in abundance of the necessary oxidising bacteria; but, he says, it is by no means necessarily the case that Malayan rivers, originating as mountain streams and receiving in their course debris of the tin mines have such purifying power, although their rapidity of flow may be sufficient mechanically to remove much waste matter.

" The writer of the report observes that a question upon which information is needed is the effect of the discharge of sewage or sewage effluent in the rate of deposit of the finer portions of silt in the river. ' Experience has shown,' he says, ' that the addition of sewage to a silt-laden water tends to cause settlement of the fine silt.' This will probably be especially the case with Malayan rivers the water in which is very soft. Any disturbance of the saline content is thus the more likely to cause deposition of fine colloidal particles.

" Dr. Fowler has had some experience in connection with the deposition of tin slimes in Cornwall, and he thinks it highly probable that much tin goes to waste in Malayan rivers. The condition of the rivers being such as is described, he considers there is no likelihood of their being used as sources of water supply for drinking purposes. The necessity for purifying sewage to the extent required where the purity of a water supply has to be safeguarded does not therefore arise, and the treatment adopted need only be sufficient to prevent nuisance and deposit in the river, and to conserve as much as possible of the manurial value of the sewage for the land.

*Sewerage.*

" Dr. Fowler next points out that, in considering both the dimensions and character of the sewers to be provided and the method of treatment to be adopted for the purification of the sewage, it is necessary to decide exactly what material should be received into the sewers. In this connection (a) town areas, (b) bungalow areas, and (c) 'kampong' areas, are considered in turn.

" (a) *Town Areas.*—The author of the report remarks that it would be satisfactory from the point of view of cost if only excreta and 'sullage' (*i.e.*, urine and liquid waste from kitchen, &c.) could be received into the sewers to be constructed. This, however, appears to be impossible in many cases, at any rate in the town areas. The cleaning of vegetables is carried out in the backyards of the houses in the town areas, and it does not seem practicable to avoid the admission to the sewer of the rain water falling on this backyard area. He suggests, however, that every effort should be made to minimise the amount of rain water thus admitted so as to keep the size of the sewers within reasonable dimensions.

" The sewage system, in fact, should be as nearly as possible what is known as the separate system. In order to obviate the necessity of a flushing cistern to every house, with consequent probable waste of water owing to mishandling, &c., Dr. Fowler agrees that small groups of houses might be treated as elements of a combined latrine, the present privies where the buckets are now placed being connected together by a common flushing channel closed except at the privy where a suitable seat would be provided. This flushing channel would be cleansed periodically by a powerful automatic flush from a cistern which would be subject to regular official inspection. The flush channels would be connected to the sewer proper through a large grid laid horizontally, and of a mesh sufficient to retain articles likely to block the sewer. The foul water from the kitchen and backyards would enter the sewer at the same point, having passed through a fine meshed grid or sieve countersunk in the cement paving of the yard.

" In view of sudden tropical showers and consequent heavy run off from backyards storm-overflows would have to be provided at suitable intervals from the sewers, discharging into the present open rain-water gullies. At such storm-overflows it might be well to insert silt traps of ample dimensions to intercept sand and other debris, although the necessity for this was not so clear as in India where in every household sand was used for cleaning brass vessels and cooking pots.

" Dr. Fowler proposes that the present public dry latrines should at the earliest possible moment be converted into water-carriage latrines, as the present arrangements can hardly help being extremely offensive. The use of such public water-flushed latrines will, he remarks, accustom the people to the use of water-carriage. Moreover, pending a complete system, a dump-hole might be provided in connection with such latrines through which the contents of the present buckets might be discharged into the sewers, together with an ample flush of water. The result of this would be that the expense of carting the buckets long distances with its offensive accompaniments would be reduced.

" (b) *Bungalow Areas.*—It appears to Dr. Fowler that the connection of bungalows to the sewers and the provision of modern sanitary equipment is quite practicable where the distance between bungalows does not exceed 100 yards. This might be taken roughly as the economic limit, with, of course, necessary exceptions. In other cases some special

means of treatment of the sewage either by a small septic tank or other device might properly be adopted. In many cases it would be possible to eliminate bath water which is only slightly polluted and also the greater part of the roof water from the sewers in the case of bungalows and admit only excreta and sullage.

"(c) 'Kampong' Areas.—Dr. Fowler has examined a number of these in the vicinity of Ipoh, and while isolated habitations surrounded by jungle do not appear to require much attention, their various waste products being inoffensively disposed of in natural ways, yet in more closely packed collections of Malay dwellings offensive conditions arise. The only practicable remedy in such circumstances appears to be the provision of buckets which may be systematically collected and the contents 'dumped' into the nearest sewer, the sullage being drained off into various natural ditches as at present.

"The report suggests that the problems presented by 'Kampong' areas might well receive the special attention of the town planner.

#### *Treatment of Sewage.*

"Dr. Fowler has no hesitation in recommending that wherever possible the activated sludge method of purifying sewage should be adopted, 'as it is the only method, other than sewage farming, which permits the conservation of the nitrogen in the sewage.'

"The Singapore Commission, he observes, recommends sewage farms 'but the difficulty about these, as ordinarily conducted, in any countries but those deficient in water, is that in order to bring enough fertilising elements to the soil, more water has to be added than the soil needs, and so unsatisfactory and swampy conditions arise, and there is considerable risk of nuisance, as well as loss of nitrogen.'

#### *Cost.*

"The cost of sewerage and sewage disposal works for a total of 250,000 people, which is roughly the population of the four towns concerned, is put at £1,500,000, equal to £6 per head, and Dr. Fowler suggests that a system of short loans should be arranged to provide the necessary money."

UNITED STATES PUBLIC HEALTH SERVICE. Public Health Bulletin. No. 111. 1921. Apr. 126 pp. With 5 figs & 6 illustrations.—  
Transactions of the Eighteenth Annual Conference of State and Territorial Health Officers with the United States Public Health Service, held at Washington, D.C., May 26 and 27, 1920.

This small publication contains a detailed account of a conference at Washington of State and Territorial Health Officers with the United States Public Health Service.

Many of the papers are of purely local interest and do not deal with subjects of special interest to tropical countries. There is, however, one we should like to refer to by C. W. STILES. It gives a report of a system of conservancy which in some ways resembles the ordinary hand-removal system common in tropical countries, and describes a very ingenious type of latrine making use of a barrel full of sawdust; a plan of this is attached. The method of construction we give in the author's own words.

"Place a water-tight hogshead (as a molasses hogshead) on skids; knock out the head, but preserve the bottom; nail four

braces on the outside of a water-tight barrel (as a turpentine barrel), about 17 in. from the top; knock out both head and bottom; set the barrel into the hogshead, resting it on the braces; fill the hogshead with sawdust up to the lower end of the barrel (or a little above this line); place sawdust in the entire space between the top portion of the hogshead and the outside of the lower portion of the barrel (to keep out flies); use the barrel as the 'riser' for the seat, and place on top of the barrel a seat with falling lid. The privy is now fly-tight in construction. It can be located at the end of a platform such as a porch, or inside an outbuilding, and its location determines whether or not steps must be built to permit its use."

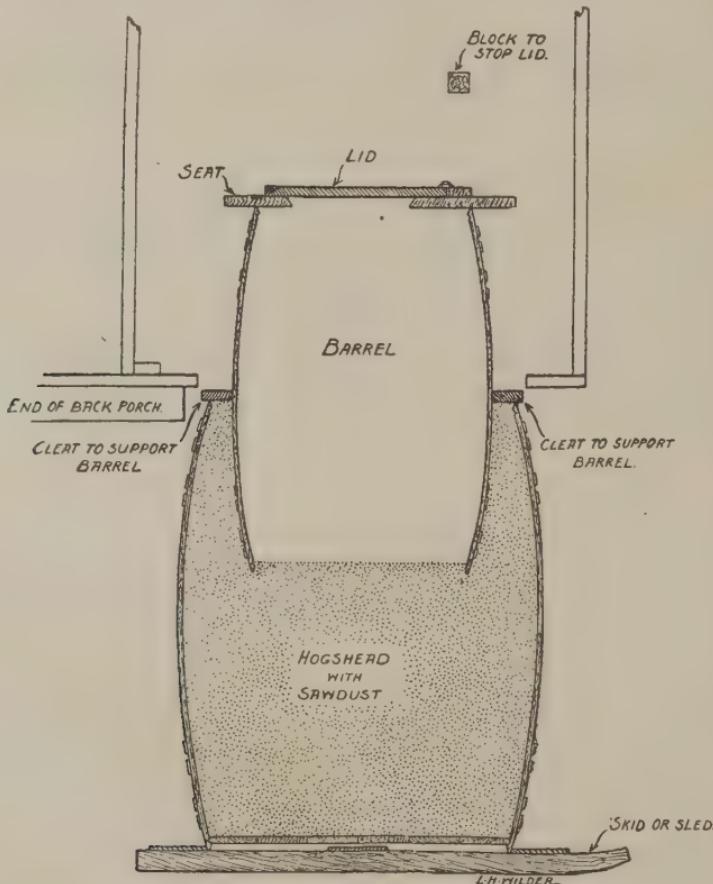


FIG. 74. Diagram of construction of a barrel-sawdust-privy.  
Note the simplicity of the fly-proof construction.  
[Reproduced from *U.S. Public Health Bulletin*, No. 111.]

The good points of the privy are that the urine is absorbed by the sawdust and kept separate from faecal discharges. Opinions as to the value of the privy appear to show that it is reasonably sanitary, but in many cases becomes infested with flies.

When it is necessary to change the sawdust, it is recommended that the barrel be dragged a considerable distance from the house and emptied out on the ground; if necessary, more sawdust is added to the heap

The writer frankly admits that the majority of these heaps of sawdust breed a very large number of flies, and it would appear to us to be a serious drawback. It is rather difficult for anyone not knowing the conditions of the place to understand why this material is not buried or burnt. On the subject of incineration, the author says that "at present this method seems to have a very limited field of practical application." Considering that many hundreds of miles of trenches in France and very many cantonments in India rely entirely on this method of disposal, we consider that the statement is hardly correct. It is admitted that sawdust will only burn satisfactorily in some form of forced draft incinerator, but even these do not present any serious difficulty.

The paper is particularly interesting because it would appear that the disadvantages of the hand removal system are practically the same all over the world.

CROHURST (H. R.). **Municipal Wastes : Their Character, Collection, Disposal.**—Treasury Department. United States Public Health Service. *Public Health Bull.* No. 107. 1920. Oct. 98 pp. With 15 charts.

This pamphlet deals in the most exhaustive way with all methods of collection and disposal of rubbish and waste products in American cities. It includes a careful description of the character of the rubbish, the staff necessary, and the cost of collection and disposal. It is quite the best résumé of the subject that has ever been published, and is so condensed that it does not lend itself to a review. There are plans of destructors and crematoria, etc.

The work should be in the hands of all sanitary officers throughout the tropics.

## WATER.

HOUSTON (Alexander). *B. Welchii, Gastro-enteritis and Water Supply.*  
—*Engineering News-Rec.* 1921. Sept. 22. Vol. 87. No. 12.  
pp. 484-487.

The writer deals with several matters concerning bacteriology of water, but particularly with the significance of spore-bearing organisms as indicative of undesirable pollution in drinking water.

The presence of spores after chlorination is also dealt with. Sir A. Houston's opinion is given as follows:—

"The evidence that spores are, *through water supply*, instrumental in causing gastro-intestinal disorders rests, for the moment, on insecure foundations, and the writer cannot help feeling that in the presence of a chlorination process which really (and not merely nominally) destroys *B. coli* in water, the danger of disease occurring has been unduly exaggerated. In cases where *B. coli* is not killed, and therefore where other non-sporing bacteria of pathogenic sort escape destruction, the results may be different, but this, if it occurs, arises out of the imperfection of the chlorination process, and is not, as the writer thinks, due to the presence of spores."

With this opinion we are entirely agreed. For very many years the milk test was carried out on Bengal and Madras waters along with the other tests. We never found that we gained any additional information by this procedure, the presence of coliform bacteria being a much more satisfactory method of estimating pollution. Eventually the Sporogenes test was discontinued.

THOMPSON (E. T.). *An Adjustable Joint for Germ-Proof Filter Cylinders.*  
—*Lancet.* 1921. Oct. 15. p. 810. With 3 figs.

The writer gives details of a new form of adjustable joint and nipple for use with the "Imperator" Patent Filter Candles,\* and



FIG. 75. 1, metal disc.  
2 & 3, rubber washers.  
4, metal cap of cylinder.  
D, fly nut.



A.

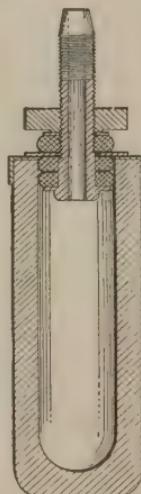


FIG. 76. Section of nipple, joint, and cylinder.

\* Made by the London Filter & Pump Co., Ltd., Imperator Works, Sharpleshall Street, London, N.W.1.

designed to reduce the risk of fracture of the candle to which fixed mounted cylinders are liable owing to differential expansion during sterilization by heat.

The construction of the nipple and joint is shown in the illustrations. To adjust the joint the nipple is pushed into the filter cylinder until the large metal disc rests on the cap of the cylinder. The fly nut is then screwed up tightly, thereby compressing the indiarubber washers and causing them to expand laterally on to the inner surface of the cylinder, thus forming an impervious joint. A metal cap fixed round the top of the cylinder effectually prevents fracture from the outward thrust of the indiarubber washers. The detachable nipple can be used for a number of cylinders, thereby reducing the cost of renewals. Dr. Thompson states that a cylinder fitted with this form of nipple has given sterile filtrates over a considerable period and that a single joint has been in use over a period of three months without loss of efficiency.

[The joint between a candle and the vessel has always been a practical difficulty, which now appears to be satisfactorily overcome.]

HODGKINSON (W.) & HUTCHINSON (C. M.). **Report on Electrolytic Chlorogen (E.C.).**—*Indian Jl. Med. Res.* 1922. Jan. Vol. 9. No. 3. pp. 586-619. With 2 folding charts.

The writers of this paper were asked to prepare a concentrated stable chlorinous antiseptic for disinfecting cholera-infected wells. The difficulties of obtaining a strong chlorinated lime are well known, so they turned their attention to improving the process of electrolysing a solution of brine. In order to fulfil the demand the resulting liquor was required to be as concentrated as possible, viz., to contain 2.3-2.5 per cent. of available chlorine. Weaker solutions are too bulky for transport, though satisfactory and much easier to manufacture if they are to be used locally and at once. Thus electrolysed sea water on board ship is a very satisfactory disinfectant as long as it is used at once and available in large quantities, but it is too weak to be economically stored or carried from place to place.

*Strength of Electrolyte.*—The best results were obtained with 20-25 per cent. salt; this obviated much waste of current, and gave a result of 2.5 3 per cent. concentration. The cells were used in series of 12 to 18, with the usual 110 volt generator, each cell taking 6-8 volts apiece; calculating 50 per cent. efficiency of the cell, each ampere hour will render available 0.66 gm. of chlorine per cell.

“ Thus a 5 Kw. generating plant, suitable for X-ray work and operation theatre illumination, would produce four gallons of hypochlorite solution of 2.5 per cent. Cl strength (referred to hereinafter in this report as E.C.) per hour, this quantity being sufficient to sterilize 80,000 to 160,000 gallons of water. It will be seen, therefore, that, with a stability period in the hot weather of six weeks, it should be possible to produce this solution at points well within the range of transport permitted by such a period of stability. The same plant would produce approximately 30 gallons of Dakin's solution of 0.5 per cent. Cl<sub>2</sub> strength per hour. Alternatively, a complete outfit for field work, comprising 1½ kw. dynamo, mule gear and cells, could be made to form a load for four small mules and weigh less than 600 lb., and could be operated by two mules. This would produce sufficient E.C. to sterilize, say, 20,000 gallons of water per hour.”

Electrodes used were Acheson's specially prepared graphite—these gave nearly as good results as platinum. The cheaper forms of carbon electrodes are unsatisfactory, as they disintegrate and the particles destroy the action of the current. The chief difficulty in the use of the cells is to keep the electrolyte cool during electrolysis. This is best done by circulating cold water through the fluid in a coil of pipe.

“ The rate of rise of temperature of the electrolyte will naturally vary, *caeteris paribus*, with the ratio between the current and volume of brine in the cell, so that it is difficult to obtain a high rate of electrolysis, *i.e.*, high ratio of current to electrolyte, without at the same time undergoing risk of undue rise of temperature. The rate at which electrolysis can be carried out safely will therefore depend largely upon the efficiency of the cooling arrangements, and this again will depend upon the design of the electrolyser and the temperature and rate of flow of the cooling water. Generally speaking, therefore, it may be said that we should aim in designing our electrolyser at an appropriate mean between high-rate electrolysis requiring the rapid flow of large quantities of low temperature cooling water, and the slow and prolonged action of small currents with poor cooling. . . . In actual practice the type of electrolyser above referred to, of which the overall dimensions are 14½ in. × 8 in. × 17 in. and the weight about 30 lb., working with a current of 5 amps. at 24 volts, and with cooling water at 25° C., will turn out 3·6 litres of 0·5 per cent. E.C. in 6·5 hours consuming about  $\frac{3}{4}$  unit electricity. The actual out-turn depends upon the number and size of the cells, and this again is determined by the current available as before explained ; the electrolyser actually now in use at Pusa is made up of only four cells holding 900 cc. each.”

*Stability.*—“ Absolute stability of hypochlorite solutions is unknown owing to occurrence of hydrolysis ; the relative stability period of E.C. includes an initial one of very slow loss of available chlorine followed by a second in which the rate of loss undergoes obvious acceleration. The initial or stable period varies in length on the one hand with method of preparation, and on the other with conditions of storage. With no addition of stabilizers and at plains temperatures (30° C.) this initial period is infinitely short, and stability is nil ; by the use of lime and sodium rosinate the initial period may be extended to six weeks or more at 30° C., and to as much as 20 weeks or more in hill stations or in a cool incubator at 20° C.–22° C.”

EGYPT (Ministry of the Interior). Department of Public Health.

**Reports and Notes of the Public Health Laboratories, Cairo.**

**Egyptian Water Supplies.** [TODD (C.), Director, Public Health Laboratories.]—105 pp. With 4 charts. 1920. Cairo : Government Press. Government Publications Office, Old Ismailia Palace, Sharia Qasr el Aini. [Price : P.T. 20.]

Some tests made on an apparatus for the preparation of electrolytic hypochlorite installed by Vincent Roberts & Co., Leeds.

“ The electrolyser has so far worked satisfactorily, the results being practically constant.

“ With a current of 10 amperes at 120 volts, and using a 5 per cent. solution of common salt, it gives a yield of one litre per minute of a solution containing slightly over 3,000 parts of free chlorine per million (one-third per cent.).

" The cost of the solution so prepared, including the cost of the salt and of the electric current—but not including any allowance for cost of labour or of the apparatus—works out as follows :—

" (a) Electricity bought from a company and transformed, as at Abbasiya, 0.7 milliemes per litre.

" (b) Electricity taken from a Government-owned plant, 0.28 milliemes per litre.

" So far no difficulty has been experienced from overheating."

N.B.—1 millieme = 1 farthing English.

STREETER (H. W.). **The Loading of Filter Plants.**—*Public Health Rep.* 1922. Mar. 31. Vol. 37. No. 13. pp. 741-753. With 2 charts.

The writer deals with several very interesting points concerning purification of water for town supplies.

In the first place, he points out that the great rivers of America are steadily getting worse as regards pollution; year by year they contain a higher bacterial amount and a greater number of coli per cc. Practically all the towns on the river employ filtration plants; by careful scrutiny of the results obtained, it has been found that there is a distinct relation between the quality of the water supplied to the filters and the quality of the effluent.

The relationship was discovered by investigating the "method of grouping" used by statisticians in studying the nature of relations existing between two variables.

By plotting the bacterial figures for raw water and effluent as given in Table 1 on logarithmic ordinate and abscissa scales, the correlated values are found to plot along paths closely following straight lines, indicating that the relation between the two variables is that of a power function having the simple formula

$$E = cR^n$$

in which (E) represents the bacterial content of the effluent, (R) that of the influent, and (c) and (n) constants defining roughly the average efficiency of purification and relative constancy of effluent under different loadings respectively. In general, the higher the value of (c) the lower will be the average efficiency of purification, whereas the higher the value of (n) the less uniform is the character of effluent obtained under different loadings.

The coefficients (c) and (n) have been worked out for the Ohio River both for bacterial efficiency for the entire process, including chlorination, and for the various steps in the process. These are given below.

Values of constants (c) and (n) in formula  $E = cR^n$  defining bacterial efficiency of entire purifications process, including chlorination.

			(c)	(n)
Gelatin count	..	..	4.41	.27
Agar count	..	..	.23	.55
<i>B. coli</i>	..	..	.29	.30

Values of constants (c) and (n) in formula  $E = cR^n$  for various steps of purification process. Based on *B. coli* data in Table 1.

			(c)	(n)
Plain sedimentation	..	..	7.10	.66
Coagulation	..	..	.31	.65
Filtration	..	..	1.11	.37
Chlorination	..	..	1.32	.44

A similar set of figures, working with the same constants, were obtained from thirteen waterworks on the Mississippi. It was found that the calculated results and the observed results came very close, so close, indeed, as to show that the formula was of distinct service in estimating the probable efficiency of any purification process.

The formula has another very obvious use, namely, that if a good water is to be obtained from any stream the quality of the raw water should be of a definite standard; in other words, it should not contain more than a fixed number of coli-bacteria per 100 cc. In this way the International Joint Commission deduced the loading standard for filtration plant purifying the Great Lake water.

The standard selected was that the raw water delivered to the filter should not contain as a yearly average more than 500 *B. coli* per 100 cc. The drinking water produced from this raw water should not contain more than 2 coli per 100 cc. The standard load point was admittedly a tentative one derived from broad experience rather than experimental data; its general utility has been supported by recent work for the Ohio River.

The maximum load value of this water consistent with producing a good filtrate (not more than 2 coli per 100 cc.) is admitted to be not more than a filter of 650 coli per 100 cc. This figure is the result of considerable research and the use of the formula already described.

It should be observed that it is not very different from the standard set by the International Joint Commission.

The author makes the following remarks concerning the work still required on this subject.

In addition to a definition of standards for filter-plant effluents, further knowledge of the problem discussed in this paper is needed along the following lines:—

1. As to the influence of seasonal and climatic factor, type of raw water, relative age of its pollution, and operation conditions upon the efficiency of water-purification plants and upon their limits of safe loading.

2. As to the rôle of chlorination in relation to filtration processes in determining their limiting safe loading.

3. As to the economic limits of water as related to stream-cleaning measures.

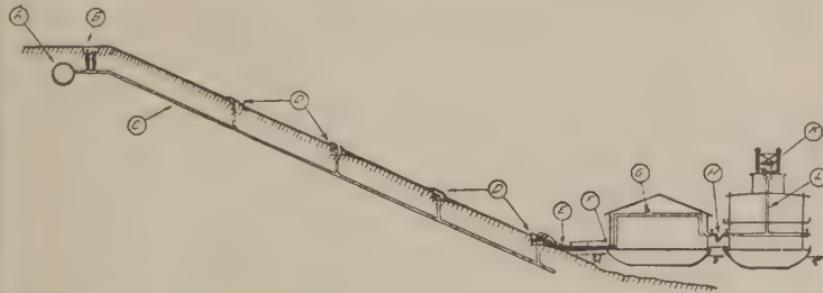
If research on these lines is to be undertaken in tropical countries, the coefficients (c) and (n) will have to be ascertained by experiment, and we consider two sets will be required, one for the monsoon and one for the dry weather.

**GORMAN (Arthur E.) & SULLIVAN (Edmund C.). Sanitary Methods for supplying Vessels with Water for Drinking and Culinary Purposes when obtained from Sources Ashore.—*Public Health Rep.* 1922. Mar. 17. Vol. 37. No. 11. pp. 613-630. With 4 figs.**

The writers point out a fact which must be known by all Health Officers of Ports, namely, that there is a right and wrong method of supplying water from a hydrant to a ship anchored alongside a wharf. In many cases the wrong way is used, very long hoses are employed, and considerable amount of undesirable contamination passes into the water tanks.

The writers make several sound suggestions for the proper installation of shore connections with the town supplies.

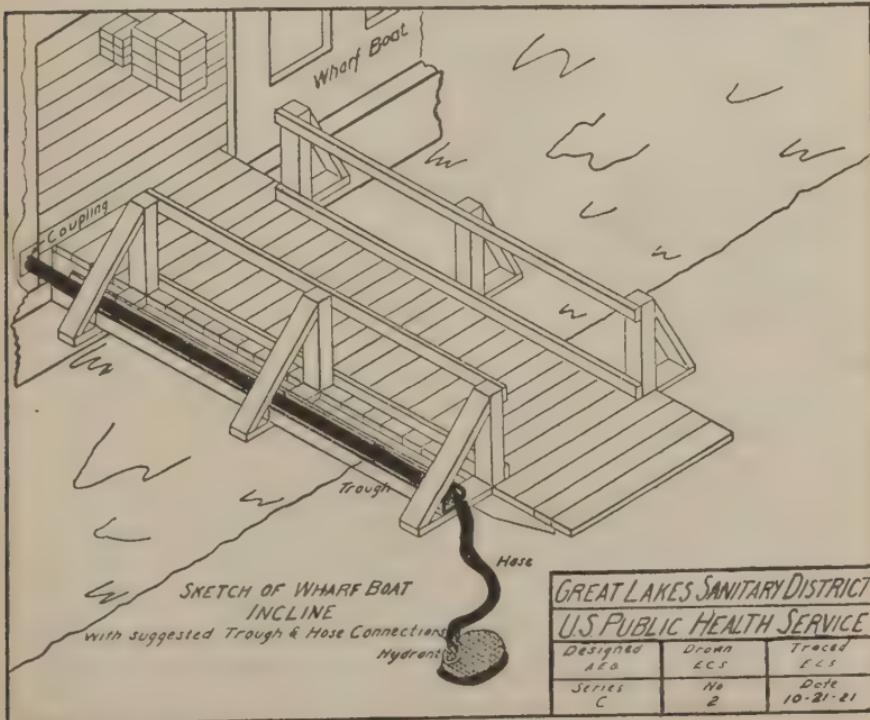
**SKETCH OF RIVER LANDING  
Showing  
System for Supplying "City" Water to Vessel**

**Notes:**

- A - Street Main
- B - Shut-Off & Meter Box
- C - Special Landing Service Main
- D - Service Hydrant & Hydrant Boxes
- E - Connecting Hose to Wharf Boat
- F - Coupling of Side of Wharf Boat
- G - Galvanized iron piping System on Wharf Boat
- H - Connecting Hose to Vessel
- I - Storage Tanks on Vessel
- J - Galvanized iron piping System on Vessel.

**GREAT LAKES SANITARY DISTRICT  
U.S. PUBLIC HEALTH SERVICE**

Designed AEC	Drawn ECS	Traced ECS
Series C	No 3	Date 10-24-81



**SKETCH OF WHARF BOAT  
INCLINE  
with suggested Trough & Hose Connections**

**GREAT LAKES SANITARY DISTRICT  
U.S. PUBLIC HEALTH SERVICE**

Designed AEC	Drawn ECS	Traced ECS
Series C	No 2	Date 10-21-81

Figs. 77 and 78.—Method for supplying vessels with "City" water for drinking and culinary purposes.

[Reproduced from *Public Health Reports*.]

*Recommendations.*

“ 1. Where water to be used for drinking and culinary purposes on vessels is obtained from certified sources ashore, hydrants from which this water is to be drawn should be located on the pier, dock or landing so that this water can be conveniently delivered to the vessel through a hose or pipe, with a minimum opportunity for exposures to possible sources of contamination.

“ 2. Consistent with local conditions, the length of hose necessary to deliver water from the hydrant on the pier or landing to the boat should be as short as practical.

“ (Note.—By installing a delivery pipe line, from the lower deck of a vessel to the storage tanks, a length of hose necessary to connect the hydrant to this delivery line will be all that is necessary.)

“ 3. In river shipping, when the water for drinking and culinary purposes for a vessel is obtained from sources ashore, the hose connecting the hydrant on the landing to the wharf boat should be protected against possible contamination from being accidentally dropped into the river by attaching it to a guide board or passing it through a protecting conduit fastened to the gang-plank.

“ (Note.—For delivery of water across the wharf boat a special pipe line should be installed.)

“ 4. In locating the drinking water hydrants on piers, wharves, landings and wharf boats, special consideration should be given to the nature of the traffic at these places, with a view to preventing contamination of the delivery hose connections on the hydrant.

“ 5. All hydrants at which drinking water is obtained at the pier, wharf, landing or wharf boat should be identified as such by a conspicuous sign of letters not less than 4 inches in height; and in case hydrants at which water for other than drinking purposes is available are located on the pier, wharf, landing or wharf boat, they should be painted red and the drinking water hydrants white, and both identified by signs.

“ 6. The hose used for filling drinking water tanks on vessels should be used for no other purposes, and it should be stored aboard the ship or at the pier, wharf, landing or wharf boat, so as to protect it against possible contamination.

“ 7. One of the licensed officers of every vessel should be designated as ‘ water supply officer ’ and held responsible for the drinking water provided on the vessel.”

THE SURVEYOR & MUNICIPAL & COUNTY ENGINEER. 1922. Jan. 27.  
Vol. 61. No. 1,567. pp. 57-81.—**Municipal Engineering in 1921.—**  
**Water Supply.**

“ Dr. Thresh dealt with the action of water on lead at a meeting of the Society of Public Analysts. The views of chemists upon this point are conflicting. Dr. Thresh finds that water free from dissolved oxygen has no action on lead, but that if free oxygen is present action begins at once and continues until all the oxygen is used up. A paper was also read before the Institution of Civil Engineers of Ireland on Lead Poisoning of Water Supplies, by Mr. James F. Reade. Plumbo-solvency and erosive ability were discussed. The fact that the usual water analysis gives no indication of the plumbo-solvent or erosive character of the water was held to be a matter of importance, and it was suggested that water analysts should supplement their reports in this respect.”

## SMALLPOX VACCINATION.

MINISTRY OF HEALTH. Reports on Public Health and Medical Subjects. No. 8. **Small-pox and Vaccination.**—19 pp. 1921. London : Published by H.M. Stationery Office. [Price 3d.]

This little pamphlet contains an extremely interesting and condensed account of smallpox vaccination in England during the last forty or fifty years. There is, of course, very little actually new, but the facts are marshalled in an effective way. Unfortunately, we can hardly do it justice in a review.

The following appear to us to be of particular importance. The value of vaccination depends largely on how it is done and the number of points. Figures from the Fulham Smallpox Hospital for the years 1880 to 1885 show that in vaccinated cases of all ages the percentage of fatality was :—

1 mark .. .. ..	10.37 per cent.
2 marks .. .. ..	8.73 ..
3 marks .. .. ..	7.45 ..
4 marks and upwards .. .. ..	4.23 ..

“The fatality in the unvaccinated was 46.08 per cent.”

The efficiency of modern lymph is shown by these results : in 1920 this lymph, when used for primary vaccination in 262,998 cases, gave a case success of 99.4 per cent. and an insertion success of 96.3 per cent.

The main points are given in the summary which is quoted below :—

“ We know that the mortality from small-pox is much less now than in pre-vaccination times, that the greatest diminution in the small-pox mortality is found in the early years of life in which there is most vaccination ; that in countries in which there is much vaccination and re-vaccination relatively to the population, there is little small-pox ; that in places where small-pox prevails it attacks a much greater proportion of the unvaccinated than the vaccinated, especially where the vaccinations are comparatively recent ; that in houses invaded by small-pox in the course of an outbreak not nearly so many of the vaccinated inmates are attacked as of the unvaccinated in proportion to their numbers ; that the fatality rate among persons attacked by small-pox is much greater age for age among the unvaccinated than among the vaccinated ; that the degree of protection conferred by vaccination corresponds to the thoroughness with which the operation has been performed, four marks affording much better protection than one or two ; that the protection afforded by vaccination wanes with lapse of time ; that improved sanitation, however beneficial in itself, cannot account for these facts ; and that though early diagnosis, prompt isolation of small-pox patients in suitable hospitals, effective disinfection, supervision of ‘contacts,’ and other such public health measures are invaluable, they are no substitute for vaccination.”

BOMBAY. Report of the Arthur Road Hospital for the Year 1920.  
 [CHOKSY (N. H.), Assistant Health Officer.]—8 pp. With  
 1 folding chart.

*The Vaccinal Condition of Smallpox Patients.*

Year.	Vaccinated Patients.			Unvaccinated Patients.		
	Admissions.	Case-mortality rate per cent.	Admissions.	Case-mortality rate per cent.		
1909	226	14.1	187	42.2		
1910	399	18.0	286	41.9		
1911	202	10.8	138	39.8		
1912	426	16.9	232	40.5		
1913	132	18.1	71	36.6		
1914	182	19.2	101	33.6		
1915	267	12.3	173	36.9		
1916	801	13.7	341	32.3		
1917	234	12.3	195	26.6		
1918	833	12.4	578	38.5		
1919	357	10.0	325	40.9		
1920	306	10.5	214	37.8		

The following table compares the incidence of mortality among the total admissions from smallpox during the last 33 years :—

Vaccinated Patients.				Unvaccinated Patients.			
Admissions.	Deaths.	Recoveries.	Case-mortality rate per cent.	Admissions.	Deaths.	Recoveries.	Case-mortality rate per cent.
7,413	1,077	6,330	14.5	6,064	2,170	3,894	35.7

*The Vaccinal Condition of Children under Ten Years of Age.*

Unvaccinated.					Vaccinated.				
Periods.	Nos.	Deaths.	Recoveries.	Case-mortality rate per cent.	Nos.	Deaths.	Recoveries.	Case mortality rate per cent.	
1 to 6 months	8	3	5	37.5	—	—	—	—	
7 to 12 "	1	—	1	—	1	—	1	—	
1 to 5 years	30	13	17	43.4	16	1	15	6.3	
6 to 10 "	15	3	12	20.0	20	1	19	5.0	
Total	54	19	35	35.2	37	2	35	5.4	

DUKE (H. Lyndhurst). **A Simple Container for Transport of Smallpox Lymph in the Tropics.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1922. Jan. 19. Vol. 15. No. 7. pp. 232-234.

An ingenious arrangement for keeping vaccine lymph cool during transport. The drawing does not require an elaborate description. The cooling arrangement works by keeping absorbent matter,

such as lamp wick, damp from a small container of water inside the tube. Laboratory experiments show that the hotter the air temperature is the greater the difference between the inside of the container and the outside atmosphere.

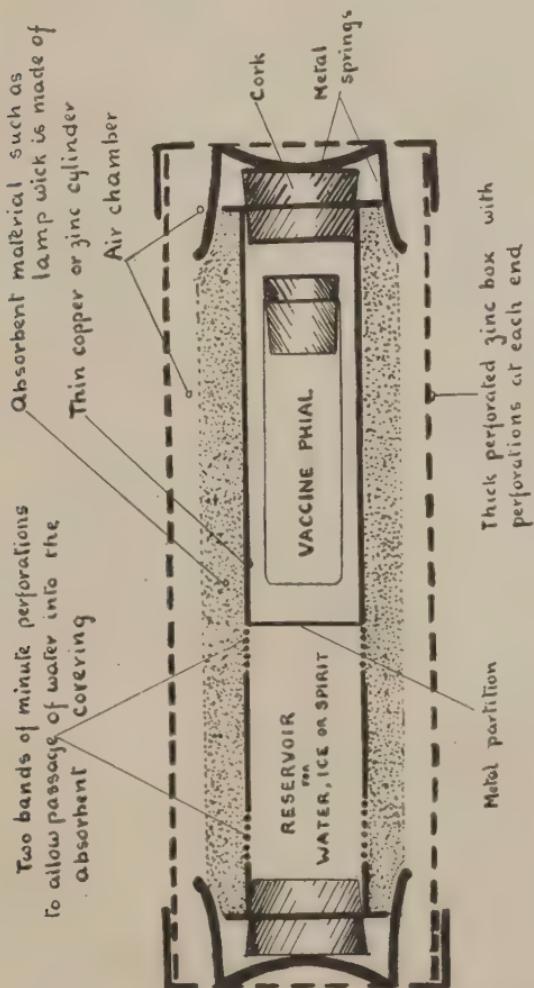


FIG. 79. Simple container for transport of smallpox lymph in the tropics.

Reproduced by permission from the *Transactions of the Royal Society of Tropical Medicine & Hygiene.*]

ILLERT (Ernst). **Ueber die Entkeimung der Kälberlymph mit Trypaflavin.** [Sterilization of Calf Lymph by means of Trypaflavine.]—*Cent. f. Bakt. I. Abt. Orig.* 1921. Vol. 86. No. 1. pp. 49-58. [Summarized in *Bull. Office Internat. d'Hyg. Publique.* 1921. Dec. Vol. 13. No. 12. p. 1339.]

Trypaflavine is a colouring material which possesses antiseptic properties. In 1 per cent. solution it kills staphylococci in 24 hours. Emulsions made from the vaccine pustules (1 in 20) with 1 per cent. solution of trypaflavine are rendered free from extraneous organisms in 24-48 hours, the usual solution of glycerine taking about 20 days.

Testing the lymph on a rabbit at the end of seven weeks and four months showed that the potency of the lymph was not in any way impaired.

MENSCHING (H.). [Sur la vaccination des femmes enceintes et des nouveau-nés, au point de vue de la transmission intra-utérine de l'immunité.]—*Arch. f. Kinderheilkunde.* 1920. Vol. 68. No. 1. p. 24. [Summarized in *Bull. Office Internat. d'Hyg. Publique.* 1921. Dec. Vol. 13. No. 12. pp. 1338-1339.]

The writer gives the results obtained in the Maternity Hospital at Hamburg following vaccination of the mothers and new-born babies during an epidemic of smallpox.

Of 684 children vaccinated with a very strong lymph a large number did not react, owing to the fact that the mothers were vaccinated shortly before delivery. 281 mothers were vaccinated within the last three months of pregnancy; the percentage success amongst the children was only 61.4. In the case of 339 mothers vaccinated at the time of child-birth the percentage of successes among the new-born babies was 75. In the latter case the child received a certain amount of immunity from the milk of the mother.

## DISINFECTION.

JOURNAL OF STATE MEDICINE. 1922. Jan. Vol. 30. No. 1.  
pp. 28-37. With 5 text figs.—Report on the Efficiency of the  
Clayton System of Disinfection and Disinfestation

“ The accompanying figures 80 and 82 illustrate the construction of the machine, and figure 81 gives explanatory curves relating to its use whilst disinfecting a room of 3,000 cubic feet capacity. The process depends on the use of sulphur, which is burnt in the iron generator through which air is drawn by the use of a fan, the resulting products of combustion being air cooled by passing through a kind of radiator before reaching the fan ; they are then driven through a hosepipe into the room to be disinfected, from which by means of a return pipe the air passes back from the room to the generator. The principle upon which the Clayton method of disinfection depends is the generation of special combinations of oxygen and sulphur, the machine abstracting air from the room undergoing disinfection, and then passing it over sulphur burning at a high temperature in a specially constructed generator, then cooling it, and subsequently driving it back into the compartment, in this way securing a perfect circulation. The delivery and abstraction are effected by a powerful blower and proceed simultaneously, the volume of air withdrawn being equal in volume to the disinfecting gas introduced, thus ensuring a good penetration of the gas, further advantages being (a) that the heat from the burning sulphur is not set free in the room, thus obviating the damages due to condensation of watery vapour which otherwise would cause discolouration and damage, this advantage being perhaps best realized by remembering that for every pound of sulphur burnt 4,000 units of heat are liberated, and (b) the charging of the room being controlled from outside the strength of the gas and the length of exposure can be determined, two important factors from the point of view of the destruction of pathogenic organisms or the killing of vermin, the toxic properties of the special combinations of oxygen and sulphur under such circumstances being greater.

“ Investigations into the composition of the gas show that it contains more than sixty times the quantity of sulphuric anhydride ( $\text{SO}_3$ ) than that found by burning sulphur in the open air under ordinary conditions ; this large increase doubtless contributes to the effectiveness of the process.”

The volume of  $\text{SO}_3$  in the room air is estimated by means of a simple test. A burette is filled with the air of the room, and some water is added and shaken up violently. The  $\text{SO}_3$  goes into solution, and the end of burette is opened under water and the amount drawn up read off.

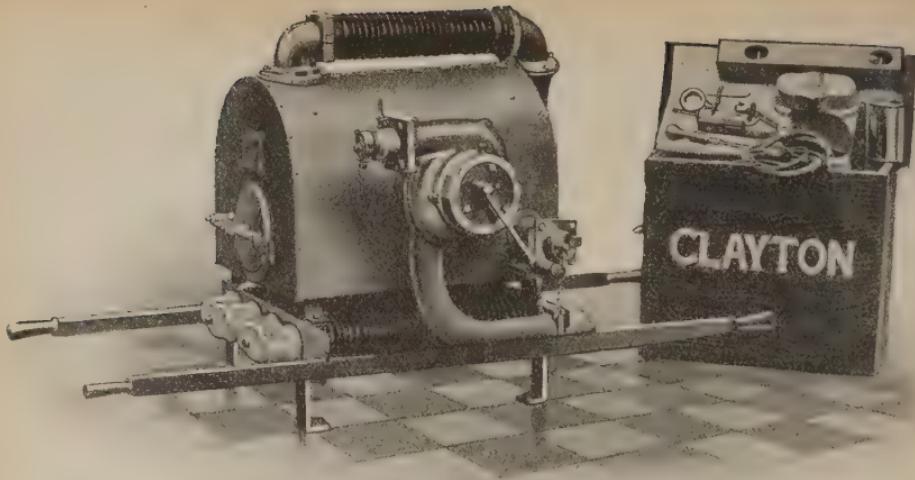


FIG. 80. Type "M" Clayton Disinfector, a hand-driven machine for use in rooms up to 6,000 cubic ft. capacity. Overall dimensions: 2 ft. 9 in. x 2 ft. 9 in. x 2 ft. 9 in. Weight: 2 cwt.

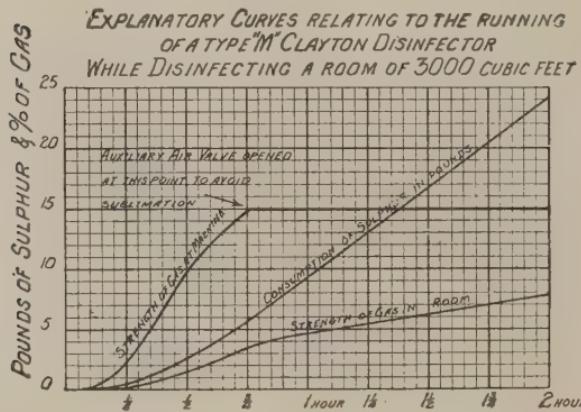


FIG. 81. Explanatory curves relating to running of Type "M" machine.

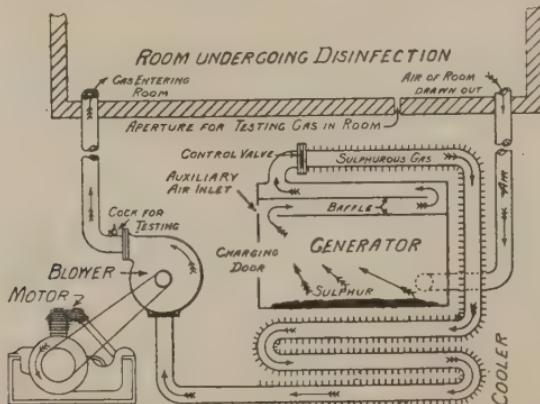


FIG. 82. Diagrammatic sketch of Clayton Disinfecting Process.

[Reproduced from the *Journal of State Medicine*.]

Tests on "*Staphylococcus pyogenes albus*, *S. pyogenes aureus*, *Bacillus anthracis*, *B. coli*, *B. diphtheriae*, *B. mallei*, *B. pestis*, *B. paratyphosus B*, *B. paratyphosus A*, *B. typhosus*, *B. tuberculosis avium* (on egg media)," were carried out for four hours; gas was pumped in and the  $\text{SO}_3$  registered 4 per cent. at the end of the time. Room remained closed four hours after stopping of the pump. *B. anthracis* was not killed, *B. tuberculosis avium* grew with difficulty, and all the others were killed.

A further experiment, giving 6 per cent. of concentration, gave similar results.

ROCA (Martinez). **Une méthode pour neutraliser les vapeurs d'acide cyanhydrique.**—*Bull. Office Internat. d'Hyg. Publique*. 1922. Vol. 14. No. 2. pp. 124-125.

The writer is impressed with the danger of the use of hydrocyanic acid as a disinfectant, particularly in places where ventilation and aeration are either impossible or very difficult. He therefore sought for a chemical agent which would unite with the remains of the HCN and make a harmless compound. He used two aldehydes—methyl and ethyl—which react with hydrocyanic acid and form a non-poisonous ammoniacal compound.

Ordinary formaldehyde gas, generated in a room containing a certain amount of HCN, will react with this in the presence of water, and will render it harmless. It is also useful for blankets, bedding and draperies, which absorb a considerable quantity of poisonous gas.

GOLINI (O.). **La deratizzazione e disinfezione delle navi a mezzo dell'acido cianidrico.**—*Policlinico*. Sez. Prat. 1921. Jan. 17. Vol. 28. No. 3. pp. 88-91.

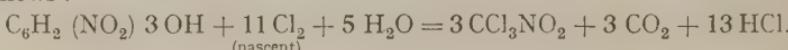
Attempts have been made to disinfect ships with poisons, steam jets, and carbon monoxide. All these methods have been found unsatisfactory (the last because of the danger of explosions). Clayton gas (sulphurous-sulphuric anhydride) has been more successful, but damages many varieties of cargo. The public health authorities in Italy are experimenting on a large scale with hydrocyanic acid, and their representative on the *Office Internationale d'Hygiene Publique* has made a long and favourable report on its use. The gas is prepared by the action of dilute sulphuric acid upon potassium cyanide. It is slightly lighter than air (Clayton gas has the disadvantage of being heavy), and excels both in toxicity and in power of penetration. A further considerable advantage is the speed with which the whole disinfection can be carried out—the ventilating shafts may be opened 1½ hours after the manufacture of the gas. It is prudent to wait for two or three hours before entering the places below deck where the gas has been liberated. It is wise also to lower some live rats into the hold and leave them there for some time to prove definitely that there is no more danger. With such precautions the use of hydrocyanic gas presents no danger. Other advantages are cheapness, non-inflammability, and the fact that no odour is left behind.\*

[It is better to use a sparrow than a rat, because it is about sixty times more sensitive to HCN poisoning than a human being.

It is a rather difficult point to decide whether Clayton gas, HCN, or chloropicrin is the best disinfective agent for a ship—each has its special advantages and disadvantages.—W.W.C.]

RANDIER (P.). *La chloropicrine : ses propriétés physiques et chimiques, sa toxicité vis-à-vis des êtres vivants, ses applications. Chloropicrination du navire atelier russe "Kronstadt."*—*Arch. Méd. et Pharm. Nav.* 1922. Jan.-Feb. Vol. 112. No. 1. pp. 56-78. With 2 text figs.

The writer gives a very full account of the physical and chemical properties of chloropicrine, its methods of preparation, and its various characteristics. It can be manufactured by the action of chloride of lime on several organic derivatives, but commercially it is made by mixing picric acid with chloride of lime; the chemical equation is as follows:—



It is well known that chloropicrine was used in the latter stages of the war, because it produces lachrymation and suffocation in certain concentrations.

It is known to possess a powerful action on fleas and bugs, the optimum concentration varying from four to ten grammes per cubic metre.

In the case of weevils in wheat the results appear to be somewhat erratic.

White ants appear to be susceptible to the drug, but in practice it is impossible to apply the remedy, because the ants usually remain in the inside of timber.

The action of chloropicrine on rats and rat-fleas is well known; it is distinctly poisonous to rodents—two or three grammes per cubic metre will kill rats in about one hour. The action on fleas is also rapid, so that chloropicrine is decidedly a satisfactory agent for deratting the holds of ships.

The latter part of this article is devoted to an account of the "deratization" of the Russian vessel "Kronstadt," which is a 16,000-ton ship with considerable passenger accommodation. The whole interior capacity was 23,000 cubic metres, which had to be charged with the gas in order to kill rats, cockroaches, and other insects. The work took 22 hours to perform. The ship was divided up into decks, and these were tackled *seriatim*. There was considerable difficulty in satisfactorily aerating the ship after the use of the drug. One hundred and sixty dead rats were recovered, and apparently all bugs and fleas were disposed of. There was no deleterious action on rubber tubing, metal or curtains.

Plague bacilli appear not to be affected in any way by chloropicrine.

For the whole ship 295 Kgm. of chloropicrine at five francs per kilogram were used; the cost was therefore 1,475 frs., which is small considering the size of the "Kronstadt."

The work of disinfecting the ship was done by one man. Disinfection can be carried out with great rapidity and with certainty of success.

## REPORTS AND VITAL STATISTICS.

PURDY (J. S.). **Infantile Mortality in New South Wales.**—*Med. Jl. Australia.* 1922. Mar. 18. 9th Year. Vol. 1. No. 11. pp. 287-296. With 6 figs.

The author gives a very interesting survey of the decline in infant mortality in New South Wales, making comparison with that of England and France.

In 1880 the figure for New South Wales was 129; in 1910 it was 72; in 1917 it fell to 56; and in 1919 it rose to 69, in consequence of the influenza epidemic.

For the town of Sydney the figures were: in 1886, 173; in 1902, 119; 71 in 1911; 59 in 1917; and 74 in 1920. The mortality in the first month of the infant's life has remained stationary for the past 20 years at 32 per thousand; these deaths are due to what are termed antenatal causes, which do not respond to quick remedial measures.

As regards postnatal causes, 24.2 per cent. is accounted for by gastro-enteritis. Since 1904 there has been a progressive decline in this figure, due to improved milk supply and breast feeding.

The figures for illegitimate births in 1920 were about double the above rates; in 1900 they were treble. In Australia the age of the mothers having illegitimate children was very young; of 2,823 mothers all were under nineteen.

The author goes on to criticize the Act of 1909, and points out where amendment is necessary. He discusses the welfare arrangements in Sydney and New Zealand, pointing out the great importance of this work if still further reductions in the infant mortality are to result.

MACLEOD (N. J.). **A Statistical Survey of the Causes of Death in Tropical Queensland.**—*Australasian Med. Congress. Transactions of the Eleventh Session held in Brisbane, Queensland, August 21-28, 1920.* pp. 328-331. With 1 folding map.

This paper covers very much the same ground as the one (reviewed on p. 63 of Sanitation Supplements, 1922) by BREINL. The author gives an account of the health conditions amongst Europeans situated in the tropical portion of Australia. A common cause of death seems to be valvular disease of the heart, and enteric fever also appears fairly common, particularly in the central western district. The infant mortality figure is, on the whole, distinctly high, and the following particulars are of great interest: infant mortality amongst the children of moderate drinkers is 28 per cent., of the heavy drinkers 46 per cent., and very heavy drinkers 74 per cent.

Malaria is not a common cause of death or sickness. He agrees with the remark of a well-known professor, namely, that climate is blamed for much of the sickness in this part of the country which is

really attributable to indolence and irregular mode of living. He considers that the Dutch in the Moluccas, who have been there for 250 years, are still a virile and energetic race, despite the climate, because they live carefully.

QUEENSLAND. **Annual Report of the Commissioner of Public Health [MOORE (J. I.)] to June 30, 1921.**—10 pp. 1921. Brisbane: By Authority: Anthony James Cumming, Government Printer. [Price 6d.]

Estimated population ..	..	..	..	..	734,379
Crude birth rate ..	..	..	..	..	27.58
Death rate ..	..	..	..	..	10.82
Infant mortality rate ..	..	..	..	..	63.43

Queensland has the highest birth rate and nearly the lowest death and infant mortality rate of all Australian States.

LE ROY DES BARRES. **Rapports annuels sur le fonctionnement du bureau d'hygiène de la ville d'Hanoï pendant les années 1919 et 1920.**—*Bull. Soc. Méd.-Chirurg. Indochine.* 1921. July. Vol. 12. No. 1. pp. 3-28; 29-50.

This is the annual report of vital statistics for 1919 and 1920. It gives the usual figures of births and deaths and morbidity, but as none of them are calculated in numbers per mille the figures are difficult to compare.

The abattoir and the slaughter of animals seem to receive a great deal of attention in this colony. About 46,000 animals are slaughtered; of these 33,000 are pigs and 9,000 cattle, and some 700 dogs; 13 bovines and 10 pigs were seized and destroyed for various causes.

RANGOON. **Report on the Working of the Rangoon Municipality for the Year 1920-21.** [STEPHENS (J. B.), Health Officer.]—37 pp. 1921. Rangoon: British Burma Press. [Price not stated.]

Death rate of estimated population ..	..	..	36.75
Birth rate ..	..	..	19.13
Infant mortality, " per 1,000 children born ..	..	..	303.53

There were 1,310 cases of plague recorded with 1,127 deaths, a mortality of 93.14 per cent.; 18 cases were imported. A certain amount of inoculation was carried out, mostly in gaols.

Seventy-four cases of cholera were reported, of which 40 were imported; and 467 cases of smallpox, of which 119 were imported.

Enteric fever has been added to the list of diseases which are now compulsorily notifiable.

Death rate from enteric ..	..	..	..	0.1
,, malaria ..	..	..	..	1.2
,, dysentery and diarrhoea ..	..	..	..	3.37

One hundred and six deaths from beriberi were reported.

UGANDA PROTECTORATE. **Annual Medical and Sanitary Report for the Year ended 31st December 1920.** [WIGGINS (C. A.), Principal Med. Officer.]—72 pp. With 1 fig. 1921. Entebbe: Printed by the Government Printer, Uganda.

TABLE III B.

*Native Populations—Births, Deaths, and Rates per 1,000 for Provinces or Districts for which Returns made, and Percentage of Still-births to Total Births.*

Province or District.	Population.	Births (living).	Deaths.	Rates per 1,000.		Per cent. of Still-Births to Total Births.
				Births (living).	Deaths.	
Buganda .. ..	791,218	12,265	14,469	15.50	18.28	1,127=8.23 per cent.
Busoga .. ..	247,645	9,005	6,980	36.36	28.18	484=5.10 per cent.
Bunyoro .. ..	92,660	1,597	2,609	17.23	28.15	953=37.37 per cent.
Ankole .. ..	266,606	6,529	6,033	24.48	22.62	773=10.58 per cent.
Toro .. ..	126,125	3,167	2,260	25.11	17.92	1,478=31.81 per cent.
Totals .. ..	1,524,254	32,563	32,351	21.36	21.22	4,815=12.88 per cent.

D'ANFREVILLE DE LA SALLE (L.). **Ce qu'il faudrait montrer à Casablanca au Président de la République.**—*Presse Méd.* 1922. Mar. 8. Vol. 30. No. 19. pp. 381-382.

This article refers to the visit of the President of the French Republic to Morocco. The writer points out that His Excellency will be shown the buildings, harbour, and the various improvements which have been recently started, but what he might be most proud of is the altered conditions amongst the inhabitants, both African and European.

Two interesting tables of mortality and birth rate are given, showing that the death rate has fallen very much since 1912, and the birth rate, both for Africans and French, has increased considerably, and is now actually higher in Morocco than it is in most parts of France and Spain.

*Death rate.*

	1912.	1915.	1920.	1921.
Total population ..	30,000	58,000	90,000	105,000
Mortality per 1,000 ..	90	38	26	23
Mohammedans ..	20,000	32,500	45,000	50,000
Mortality per 1,000 ..	109	47	31	24
French .. ..	2,000	9,000	14,000	16,772
Mortality per 1,000 ..	39	27	20	18.4
Spanish .. ..	1,200	4,500	7,500	8,121
Mortality per 1,000 ..	64	25	23.6	17

## Birth rate.

	1911.	1915.	1920.	1921.
Mohammedans per 1,000	—	—	—	34
Jews per 1,000 ..	—	—	—	46
French per 1,000 ..	19	36	39	39
Spanish per 1,000 ..	—	41	38	42

**GRENADA. Report and General Abstract of the Registrar General of Births, Deaths and Marriages for the Year 1921.** [PATERSON (N. Julian), Acting Registrar General.]—16 pp. 1922. St. George: Printed at the Government Printing Office.

	Estimated Population.	Birth rate per mille	Death rate per mille.
1921 .. ..	66,957 ..	34.86 ..	19.5
1920 .. ..	75,216 ..	33.12 ..	17.5

**TRINIDAD & TOBAGO. Health Conditions, 1920. Administration Reports of the Medical Inspector of Health, the Medical Officers of Health and the Port Health Officer for the Year 1920.**—27 pp. 1921. Printed at the Government Printing Office, Port-of-Spain.

## Summary of Vital Statistics.

Population estimated to mid-year, 1920 .. ..	388,863
Area of Colony—Trinidad, 1,754 sq. miles; Tobago, 114 sq. miles .. .. ..	1,868 sq. miles
Total number of births registered .. .. ..	11,707
Birth rate per 1,000 of population .. .. ..	30.10
Total number of deaths registered .. .. ..	9,328
Death rate per 1,000 of population .. .. ..	23.75
Total number of still-births registered .. .. ..	850
Number of deaths under 1 year .. .. ..	2,048
Infantile mortality rate .. .. ..	174.93
Notifiable infectious diseases—total death rate per 10,000 of population .. .. ..	26.74
Enteric fever per 10,000 of population .. .. ..	7.5
Tuberculosis (all forms) death rate per 10,000 of population .. .. ..	13.6
Pneumonia death rate per 10,000 of population .. .. ..	6.2
Malaria .. .. ..	22.21
Dysentery .. .. ..	15.1
Diarrhoea and enteritis .. .. ..	24.2
Bronchitis and broncho-pneumonia .. .. ..	12.3
Cardiac diseases death rate per 10,000 .. .. ..	9.6
Ankylostomiasis .. .. ..	7.9

For the statistics of the previous year, see Supplement No. 3, 1921, p. 217.

## MISCELLANEOUS.

VULLIEN. Discussion relative à la ratification de la convention sanitaire internationale de 1912. Rapport présenté au Conseil Consultatif d'Hygiène du Gouvernement tunisien.—*Arch. Instituts Pasteur de l'Afrique du Nord.* 1921. Dec. Vol. 1. No. 4. pp. 468-478.

The writer has written an interesting paper on the defects of the Paris International Convention of 1912. He points out that since the drafting of the regulations of the Convention the war has intervened, and our ideas on the epidemiology of many diseases have radically altered, and that it is time the whole document was revised and completed. To this view there is certainly no dissent. The author argues his case from the point of view of the Tunisian Sanitary Authority, and in many of his criticisms we are in accord. By far the most useful part of the critique is on plague. He asserts that five days' incubation period is insufficient, and that regulations concerning rats and their extermination are defective. He also suggests that Claytonizing for infected ships should be obligatory—an opinion we have always held, except that we go further and say that all grain ships should always be treated whenever empty, whether there is direct evidence of infection or not. The author is satisfied with the yellow fever clauses; we consider them defective for truly tropical ports. Typhus requires adding to the document on recognized lines of delousing all third-class passengers and baggage, etc.

SNYDER (T. E.). White-Ant-proof Wood for the Tropics.—*Jl. Econom. Entom.* 1921. Dec. Vol. 14. No. 6. pp. 496-501.

The writer deals with the subject of rendering wood unattractive to white ants by means of chemicals.

He points out what is well known to all residents in the tropics, that it is not the hardness of the wood that protects it from termites, but the amount of oil present; thus Indian teak and certain other oily woods are not readily attacked, but as this timber gets old it becomes less resistant; and it is not unusual to find the inside of an old teak beam completely eaten out.

Several of the American woods, particularly the longleaf pine and some forms of juniper, are left alone on account of their resinous heartwood.

The author deals with cabinet wood and also with timber for buildings. He recommends dipping cabinet wood into a mixture of chlorinated naphthalene at a temperature of 220° to 240° F. for about fifteen minutes. He does not, however, give a formula of the substance recommended, so that the reader is not really much wiser. The wood takes up a certain amount of this compound, and when it has dried will resist white ants and moisture, while a fair polish is possible. For wood in buildings he strongly recommends coal tar creosote. For plyboards it is possible to mix a certain amount of bi-chloride of mercury with the wood pulp, and in this way make a board which is not destroyed by termites.

As already stated, we do not consider the article increases the knowledge of the reader, for it is based on two assumptions: (1) that the American white ants, *Reticulitermes* spp., are just as destructive as

tropical species, and (2) that woods that have successfully resisted the ravages of the one will resist those of the other. From long and bitter experience of the depredations of white ants in the East and in Central Africa, we believe both these statements to be incorrect; at any rate, the few experiments carried out by the author do not justify the conclusion he draws.

GIEMSA (G.). **Sauerstoffmangel als Ursache von Erstickungsanfällen, in schlecht ventilirten Räumen, besonders in Schiffsräumen (mit Demonstrationen).** [Lack of Oxygen as Cause of Suffocation in Badly Ventilated Spaces, especially Ships' Holds.]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1922. Vol. 26. No. 3. pp. 81-82.

These experiments with oxygen-absorbing substances were made in flasks which communicated with the outer air by a narrow glass or capillary tube. As long as the temperature remained constant no gaseous exchange took place. An apparatus was devised for measuring the rate of absorption of oxygen. In a five-litre flask into which pieces of filter paper soaked in linseed oil were introduced, the volume of oxygen after thirty-six hours did not exceed 2·5 per cent. The author believes that in cases of collapse in well shafts, sewers, and the like, a careful examination will trace the cause to want of oxygen, owing to various processes of oxygen absorption.

In Supplement No. 1, March 30, 1921, p. 80, we referred to some experiments proving that damp tobacco would absorb practically all the oxygen in the air of a room; this appears to confirm the conclusion of the writer.

BENGSTON (Ida A.). **Preliminary Note on a Toxin-producing Anaerobe isolated from the Larvae of *Lucilia caesar*.**—*Public Health Rep.* 1922. Jan. 27. Vol. 37. No. 4. pp. 164-170.

The author states that in the larvae of the green fly, *Lucilia caesar*, an organism has been found which very closely resembles ordinary botulinus. The bacillus inoculated into animals has caused death in three days, with congestion of the vessels of the brain and meninges.

ARENAS (Felipe) & RAYMUNDO (José M.). **Medical Inspection of Schools in the City of Manila.**—*Monthly Bull. Philippine Health Serv.* 1921. Sept. Vol. 1. No. 3. pp. 109-110.

From June, 1921, beginning of school year 1921-22, to September, 1921, 13,199 students were examined. Of this total the following diseases were found to predominate:—

Dental caries .. ..	per cent.	58·5
Chronic conjunctivitis .. ..	"	14·6
Tinea .. ..	"	5·6
Trachoma .. ..	"	1·7
Scabies .. ..	"	1·3
Ulcers .. ..	"	1·0
Anaemia .. ..	"	0·8
Acne .. ..	"	0·5

CAMUS (José S.). **Rice in the Philippines.**—*Philippine Agric. Rev.* 1921. 1st Quarter. Vol. 14. No. 1. pp. 7-86. With numerous illustrations.

This publication, which is entirely devoted to the cultivation of rice and the various varieties to be found in the Philippine Islands, is extremely interesting and well illustrated. The subject matter hardly comes within the scope of applied hygiene, and we do not feel justified in giving a review. The book is very complete, dealing with the treatment of the land, three systems of growing rice, transplanting, harvests, rotation of crops, fertilisers, and, in fact, everything connected with the industry. There is also an interesting section on the various insect pests that are to be found in the East in connection with rice cultivation.

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JACKSON (Thomas W.). **Public Health in the Dominican Republic.**—*Amer. Jl. Trop. Med.* 1921. Nov. Vol. 1. No. 6. pp. 331-349. With 4 figs.

LYAUTEY (Gaston) & NEVEUX. **Étude sur la maison coloniale type.**—*Rev. Méd. et Hyg. Trop.* 1921. Vol. 13. No. 4. pp. 103-106.

SARKAR (Sarasi Lal). **The Prophylactic Value of Inoculation against Influenza from the Experience of an Epidemic at Khulna Jail.**—*Indian Med. Gaz.* 1922. Feb. Vol. 57. No. 2. pp. 51-52.

SCHWARZ (L.). **Mossul. Kurze Mitteilung ueber die hygienischen Verhältnisse 1916-18.**—*Arch. f. Schiffs- u. Trop.-Hyg.* 1922. Vol. 26. No. 2. pp. 38-43.

TAYLOR (J. A.). **The Lingual Application of Iodine as a Prophylactic in Cerebro-Spinal Meningitis and Influenza.**—*Uganda Protectorate Ann. Med. & San. Rep. for the Year ended 31st December, 1920.* pp. 69-70.

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## BOOK REVIEW.

GHOSH (Birendra Nath) [F.R.F.P. & S. (Glasg.)] & DAS (Jahar Lal) [D.P.H. (Cal. Univ.)]. **A Treatise on Hygiene and Public Health, with Special Reference to the Tropics.** Fourth edition. With an Introduction by Colonel Kenneth MACLEOD.—xxiii+507 pp. With 62 text figs. 1921. Calcutta: Hilton & Co., 109, College Street. [Price Rs. 6, or 9s. 6d. net.]

This little work was first published in 1912, and is now in its fourth edition. Practically all the mistakes have been eliminated, and a great deal of new matter has been added. There are now chapters on Maternity and Child Welfare, Medical Inspection of Schools, and many important preventable diseases, such as tuberculosis, beriberi, etc.

On the whole, the book is very complete. We would suggest, however, for future editions that incineration of night soil should be very much more fully discussed in the light of experience that has been acquired during the war; at present this important subject only occupies about half a page.

The book is equally satisfactory from the point of view of the student preparing for an examination and the medical officer of a district.

W. W. C.